

DIVISION OF ENVIRONMENTAL HEALTH AND COMMUNICABLE DISEASE PREVENTION

# OFFICE OF SURVEILLANCE



**BIO-TERRORISM,  
COMMUNICABLE DISEASE,  
AND ENVIRONMENTAL SURVEILLANCE**

## **2004 ANNUAL REPORT**

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*Hypothermia*

*Hazardous Substances*

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*E. coli*

*Hepatitis*

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**SALMONELLOSIS**

*Carbon Monoxide Poisoning*

*Influenza* *Pertussis*

**TUBERCULOSIS**

*Gonorrhea*

*Hyperthermia* *Giardiasis*

**CAMPYLOBACTERIOSIS**

*Syphilis*

*HIV/AIDS*

**STREPTOCOCCAL DISEASE**

*Chlamydia*

*Adult Lead Surveillance*

**SHIGELLOSIS**



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## INTRODUCTION

The Office of Surveillance is responsible for the development and continuous quality improvement of an integrated statewide surveillance system for communicable, zoonotic and environmentally induced diseases and conditions. Data used in this report was gathered from disease, incident and condition reports made by medical providers, laboratories, hospitals, local public health agencies and others. Without vigilant reporting of disease, targeted and effective prevention and control measures cannot be implemented. We applaud the efforts of all reporters who make daily contributions of data so that we can identify trends in diseases and conditions. We are pleased to provide a detailed summary of our analysis of data reported in calendar year 2004.

This report is divided into three sections: Bio-Terrorism Surveillance, Communicable Disease Surveillance and Environmental Surveillance. Each section begins with a brief summary of data of interest for 2004 followed by detailed reports on specific diseases and conditions found throughout our integrated surveillance system. A table of reportable disease case rates by jurisdiction is located in the Communicable Disease section of the report. Where spatial analysis and use of Geographic Information Systems (GIS) was useful, maps have been provided to depict the data. Hyperlinks to additional information are included throughout the document.

This year's report was coordinated by Angela Krutsinger, Ph.D., Bio-Terrorism Surveillance Coordinator and compiled by Debby Hanlon. Debbie Briedwell designed the cover, and Paula Peters provided technical assistance and guidance on producing the document. Research and epidemiology staff in the Office of Surveillance analyzed the data and provided the text for the report, and our GIS staff developed the maps. All this was accomplished with the capable assistance of our office support staff.

We thank our reviewers, Brian Quinn, Public Information Specialist in the Division of Environmental Health and Communicable Disease Prevention and Dr. Bao-Ping Zhu, State Epidemiologist, Office of Epidemiology, for their thorough review and helpful comments.

We invite your questions and comments on this report. We can be reached at (573) 751-9071 or Toll-free (866) 628-9891, by Fax at (573) 751-6417, or e-mail to [lyn.konstant@dhss.mo.gov](mailto:lyn.konstant@dhss.mo.gov). Put in subject line "2004 Annual Report."

Please [click here](#) to proceed to the Table of Contents. Thank you for taking the time to read this report.

Lyn C. Konstant, Ph.D.  
Administrator, Office of Surveillance



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Selected Reportable Diseases by County, 2004

Case Counts of Selected Communicable Diseases, 15-Year Report



## Section A - Bio-Terrorism Surveillance

### Missouri's Bio-Terrorism Surveillance

The year 2004 was one of reevaluating resources and focus for Bio-Terrorism Surveillance (BTS) in Missouri. With the advent of Local Active Surveillance and Web-Based Data Entry (WBDE) and improved analysis, the BTS system became more representative, collaborative, automated, and accessible. With the cooperation, information and assistance of our many BTS partners, the BTS program has evolved into a truly comprehensive Bio-Terrorism Surveillance system providing the dependability and expediency essential to provide the earliest of warnings in identifying possible public health threats and bio-terrorism events.

The BTS Sentinel surveillance sites continue to be the foundation of the program. These sites are strategically located to ensure appropriate representation across the state as determined by population, key assets and geographic location and may consist of, but are not limited to, hospitals, Rural Health Clinics, physician practices, schools, and large employers. These Sentinels provide daily syndromic data to the Bio-Terrorism Surveillance Team in Jefferson City, either by e-mailing or faxing in the BTS [Form 1](#) or by using the newly implemented web-based system to enter the data themselves.

### Improvements & New Initiatives

WBDE for BTS would not be in effect if not for the twelve BTS Sentinel sites who volunteered to test the new BTS web-based data entry system. These sites dually reported their daily data for several months; continuing to send us copies of their reports, entering their data directly into the new system and providing feedback on the ease of use and difficulties they encountered with the new system. This successful testing and implementation of the BTS web-based data entry system, in June of 2004, allowed sites to stop faxing and e-mailing Form 1s and send their counts for the day directly to the BTS System. By the end of 2004, 32 Sentinel sites (46%) used the WBDE option for reporting daily syndromic data into the BTS System. We hope to see these numbers increase in 2005.

WBDE provides a near real time capability to both the collection of data for earlier analysis and the sharing of this data with authorized personnel, to include BTS Sentinel sites, Local Public Health Agencies (LPHAs), Epidemiologists across the state and other DHSS staff.

The advent of the BTS/WBDE reporting and analysis system also granted these BTS partners the ability to compare BTS data to their own local active surveillance efforts, relieved sites of the duplicative burden of faxing and e-mailing the daily BTS reports and has proven to be extremely helpful during "ORANGE" alerts by allowing them to review





## Section A - Bio-Terrorism Surveillance

### Improvements & New Initiatives (continued)

BTS data from other locations. The newly acquired combination of our WBDE, the continued fax and e-mail capabilities and the DHSS Disaster Situation Room's 24/7 hours of operation, provide 24/7/365 statewide reporting capabilities for BTS.

In addition, it has improved the analyses of the BTS system. This has made it easier to identify related incidents, dramatically increased timeliness and consistency of reporting and greatly increased the accuracy in the identification of trends and elevations for the various BTS syndromes (Influenza-like Illness (ILI), Rash, Respiratory, Neurological, Gastrointestinal, Fever, Chemical and Hemorrhagic). Further, it has decreased erroneous flags and provided more timely and comprehensive reports.

LPHAs selected Local Active Surveillance Sites (LASS) within their communities that demonstrate the best representation of their local picture of public health. This is done on an individual basis by assessing their population, key assets and strategic significance to assess the occurrence of disease in a community/geographic area. The LPHAs contact their LASS at regular intervals (usually weekly) to specifically ask them about the occurrence of the diseases and syndromes under surveillance. During "ORANGE" and "RED" alerts, LPHAs increase the number of their LASS, the frequency of their contacts with them and give a higher level of scrutiny to the information they collect. The linked [map](#) presents the geographic distribution of the Sentinel sites, the LASS as well as the proposed sites scheduled to start reporting via the Hospital Electronic Surveillance System (HESS).

The implementation and testing of the HESS is progressing in 2005. HESS will provide the Office of Surveillance (OoS) with vital demographic information that will help rule out and identify the causes of aberrations and trends without requiring follow-up calls, something that we cannot currently do with only aggregate information. Most importantly, HESS will provide Bio-Terrorism Surveillance with the automated receipt of data and added abilities in the identification of harmful trends and aberrations that signal public health threats and bio-terrorist events.

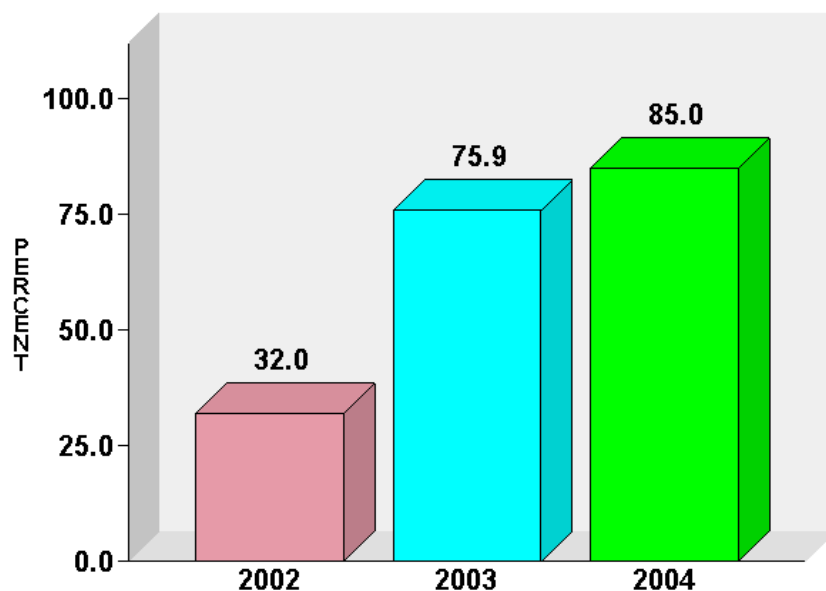
BTS feedback reports were also improved in 2004. These new reports compare the site's reported counts to those from similar sites across the state, as well as those of the previous year. These were provided to BTS Sentinel sites and statewide monthly summaries were made available on-line at <http://www.dhss.mo.gov/BTSurveillance/Data.html>. Site-specific reports are not available, as these are sent directly to the sites, and their corresponding LPHAs and epidemiologists.



## Section A - Bio-Terrorism Surveillance

### Sentinel Site Reporting

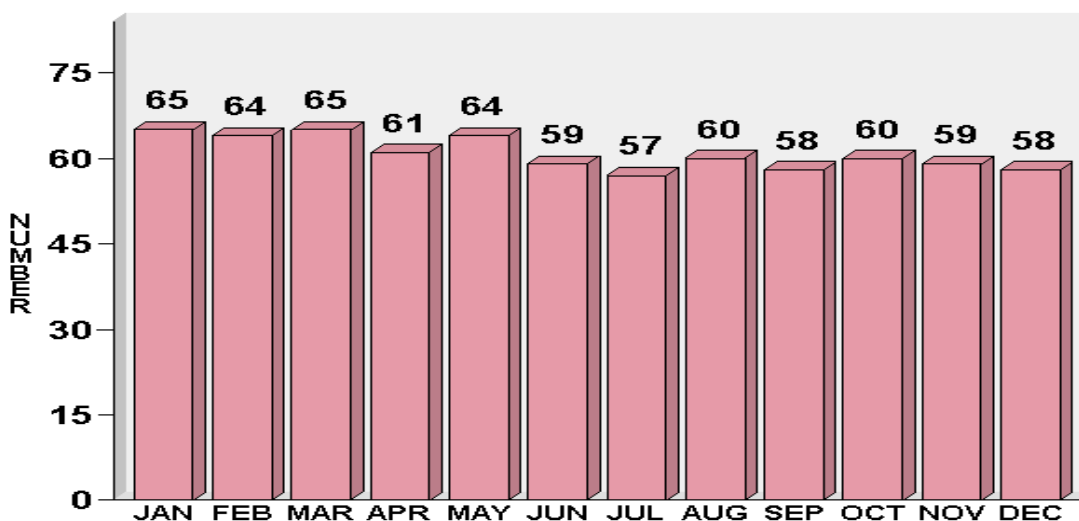
In 2004, a total of 69 BTS Sentinel sites, strategically located across the state, completed and forwarded 19,088 Bio-Terrorism Surveillance reports. This reflected an average of 26 reports being submitted by each site, each month and yielded an overall reporting frequency of 85.0%. It is important to note that not all BTS Sentinel Sites are open seven days a week.



**Figure 1A** graphically depicts the improvement in reporting frequencies for the BTS Sentinel sites. Reporting improved over 40% from 2002 to 2003 and another 9% between 2003 and 2004. These significant improvements in reporting frequencies correspondingly improved the validity and usability of BT Surveillance data as well as its analytical value.

**Figure 1A—Analysis of BTS Site Reporting Frequencies**

The number of BTS Sentinel sites reporting daily data also remained fairly consistent throughout 2004, as shown in **Figure 2A** below.



**Figure 2A—Number of the BTS Sentinel Sites Reporting**

## Section A - Bio-Terrorism Surveillance

### Distribution of Data Collected

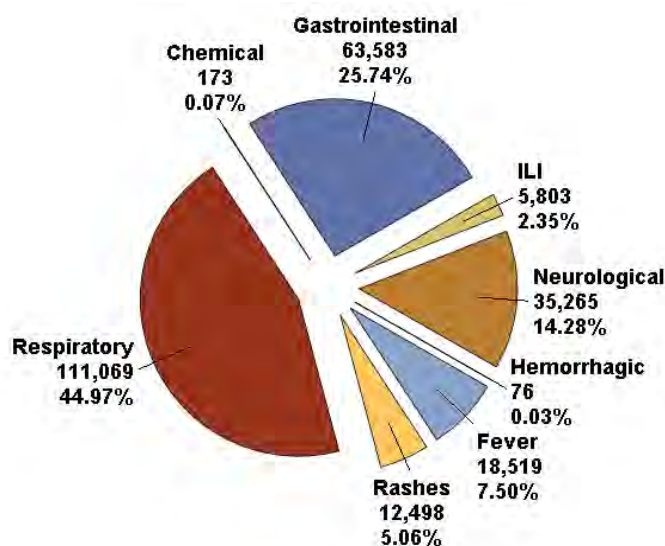
The BTS Sentinel reporting sites for 2004 include five clinics, three physician offices, fifty-five hospitals and six schools.

The majority (74%) of Sentinel sites complete the entire Form 1, reporting both syndromic and non-syndromic data to the Office of Surveillance's BTS Team on a daily basis. However, there are a number of sentinel sites (13%) who report only syndromic data and an equal number (13%) who only report non-syndromic data. A further breakdown of the types of sites who reported to BTS in 2004 and what their participation consisted of can be viewed in Table 1A.

**Figure 3A** shows the distribution of the syndromic data reported across the eight major syndromic categories. Gastrointestinal and respiratory accounted for over two-thirds of the total count. Neurologic, fevers, rashes and ILI accounted for the majority of the remaining one-third. The combined reports received in our chemical and hemorrhagic categories equaled only 1% of our syndromic counts.

**Table 1A: BTS Sentinel Site Reporting Frequency by Type of Site and Participation**

Type of Site and Participation		Number of Sites
HOSPITAL	Non-Syndromic	9
	Syndromic	1
	Both	45
	Total	55
CLINIC	Syndromic	2
	Both	3
	Total	5
PHYSICIAN	Syndromic	3
	Total	3
SCHOOL	Syndromic	3
	Both	3
	Total	6
All Types	Non-Syndromic	9
	Syndromic	9
	Both	51
	Total	69



**Figure 3A—Distribution of Syndromic Counts Reported by BTS Sentinel Sites**



## Section A - Bio-Terrorism Surveillance

### Flagging Results

The maturity of the BT Surveillance Database combined with the continued use and development of data analysis procedures that began in 2003, increased the accuracy of determining aberrations and/or elevated trends for both syndromic and non-syndromic reported data and reduced the number of superfluous flags and follow-up inquiries.

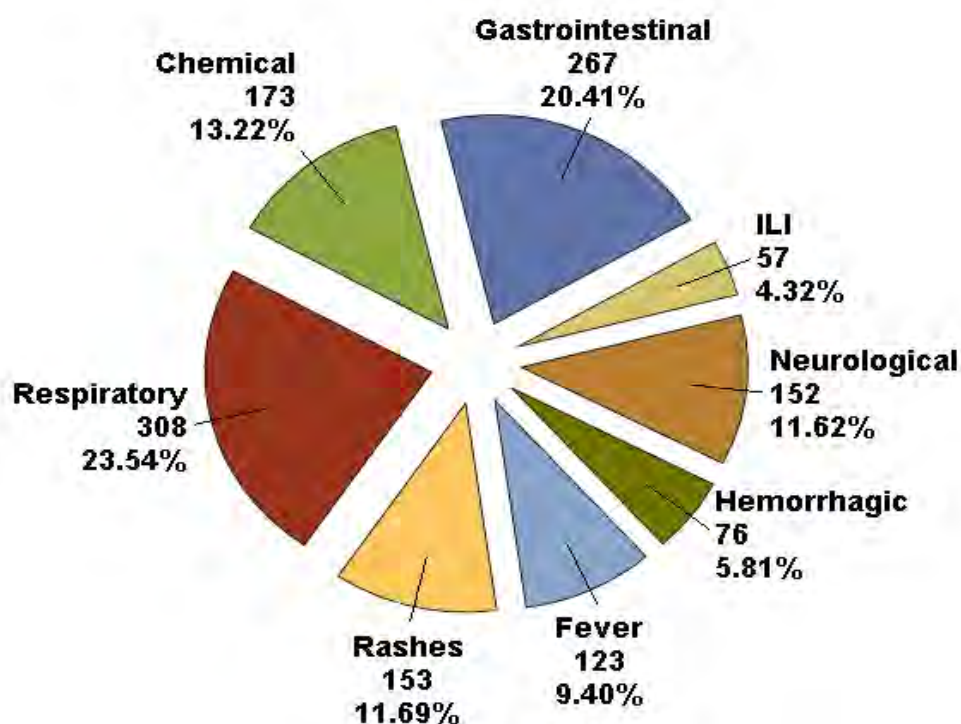


Figure 4A—Distribution of Syndromic Flagged Alerts

The analysis process for flagging in the BTS system uses two basic time groupings – month and day of week – to analyze the data in terms of deviations from computed means. Simply stated, if reported counts exceed this defined statistical criteria, a signal or flag is produced and then reviewed to determine if it is something already identified by any of the BTS partners, a natural occurrence, such as pollen season, or if there is a need to follow-up with a request for additional information from the site.

The 19,088 BTS reports submitted in 2004 generated 1,309 flags (6.9%) based on the thresholds, alerts, other information, key words and algorithms incorporated into the BTS flagging system (**Figure 4A**). Of these, 352 (1.8%) were determined to require a follow-up inquiry, of which 34% yielded significant findings. This is a 20% increase from 2003.



## Section A - Bio-Terrorism Surveillance

### Significant Findings

Every chemical and hemorrhagic occurrence reported to the BTS system automatically generates a signal or flag that requires follow-up. This was initiated to help identify Category 1 reportable diseases and chemical incidents at the earliest juncture. While these occurrences only totaled 1% of actual counts, they produced some significant flagging results, 19% of the total number of flags in 2004, as seen in **Figure 4A**.

Each chemical report is forwarded to Hazardous Substances Emergency Events Surveillance (HSEES) for further investigation. The BTS staff follows up on each of the hemorrhagic reports. This means that in every instance, the reporting site is contacted to determine if an abnormality has been seen that would suggest exposure to either a chemical or biological agent. All of the hemorrhagic reports in 2004 were due to reporting errors, STDs and dermatitis.

**Table 2A** displays the breakdown of the 178 chemical reports related to 145 chemical incidents that were received through the Bio-terrorism Surveillance System and forwarded to the HSEES program to determine if they met their case definition of a chemical event.

Thirty-nine of 145 forwarded chemical reports met the HSEES case definition and were further investigated by the HSEES Coordinator. Thirty reports classified as actual Hazardous Substances Emergency Events that affected 32 individuals and comprised 10% of all the HSEES events found in Missouri for 2004. The remaining nine reports were determined to have insufficient information available for classification.

**Table 2A—BTS chemical events reported to Hazardous Substances Emergency Events Surveillance**

	Number of Reports/Cases
HSEES Events	300
BTS Chemical Reports	145
BTS Chemical Exposure Count	178
BTS Chemical Reports that Met Case Definition (with Sufficient Information)	30
BTS Chemical Exposure Count that Met HSEES Case Definition	32



## Section A - Bio-Terrorism Surveillance

### Significant Findings (continued)

In addition to the 30 HSEES events, the Bio-Terrorism Surveillance flags and follow-up inquiries identified 82 cases of nine different reportable diseases and several unusual rashes, school closures due to illness, etc. for a total of 90 significant findings related to communicable disease (**Table 3A**).

**Table 3A—Total number of reportable diseases found through BTS**

	Number of Reported Cases
Bacterial Meningitis	1
Chicken Pox	49
Henock Scholein	1
Hepatitis	3
Influenza	20
Lyme Disease	1
Pertussis	5
Possible Tularemia	1
Tuberculosis	2
Unexplained Petichia	1
Viral Meningitis	5
Yersenia Enterocolitica	1
Total	90

BTS data is used to supplement and compliment data from other surveillance systems. To help provide a clearer and sometimes more timely picture of public health across Missouri, notifications of all significant findings (to include reportable disease cases) discovered through the BTS system are immediately sent to the appropriate personnel.

These communications improved collaborative relationships and response times and also assisted LPHAs and regional Communicable Disease and program staff with a variety of communicable disease and environmental health investigations.

The BTS team often maps geographic locations of the reigning reportable diseases reported to the Missouri Department of Health and Senior Services (DHSS) through CD-1s and MOHSIS with the incidents and rates reported to BTS of the corresponding syndrome.

In 2004, Pertussis supplanted Influenza as the communicable disease of note. A much higher than normal occurrence was identified and heightened surveillance measures were implemented, including weekly analysis of the trends and geospatial location of the Respiratory data using Respiratory Trend Direction and Percent Change and mapping the cases of Pertussis reported to DHSS and the number of respiratory reports received from the BTS Sentinel system ([Pertussis/Respiratory 2004 map](#)).



## Section A - Bio-Terrorism Surveillance

### Trends and Elevations of 2004

Dynamic analyses methods and three years of BTS Sentinel syndromic data greatly increased the accuracy in the identification of trends and elevations for the various BTS syndromes (ILI, Rash, Respiratory, Neurological, Gastrointestinal, Fever) and decreased erroneous flags by over 50%.

The links found on this page fall into two categories, Plots and Tables. The Plots graph the actual numbers reported and the total number of flags/signals/alerts identified for each syndrome, by month, over the course of 2004. The Tables provide a side-by-side comparison of this information to that of the previous year (2003), and also depicts the elevations identified when a significantly different percentage of flags than of counts was produced.

The most significant difference in reported syndrome counts in 2004 when compared to 2003 was in relation to ILI. Most ILI counts ([Influenza-Like-Illness Plot](#)) in 2004 occurred in the January-March quarter. There was not an October-December quarter increase in ILI counts as was seen in 2003. In fact, ILI cases reported in 2004 were about one-third the level reported in 2003 as shown in ([Influenza-Like-Illness Table](#)). As would be expected, the number of alert flags generated by the ILI syndrome in 2004 was significantly below the number seen in 2003.

The respiratory syndrome always results in the largest total counts of any syndrome. This was also true in 2004 even though respiratory counts were lower than what was seen in 2003 ([Respiratory Table](#)). In 2004 (as is the norm) most respiratory illness was reported in the first and last quarters of the calendar year ([Respiratory Plot](#)). The 2004 fever of unknown origin syndrome count was also significantly below the level reported in 2003 ([Fever Table](#)). As shown in ([Fever Plot](#)) the fever syndrome counts were slightly higher in the summer months when compared to the rest of the year.

The gastrointestinal syndrome reported count in 2004 was higher than the level seen in 2003 ([Gastrointestinal Table](#)). This was due to higher reported counts in 2004 in the late winter and early spring periods of the year ([Gastrointestinal Plot](#)). Both the neurological syndrome counts ([Neurological Table](#)) and the rash syndrome counts ([Rash Table](#)) in 2004 were very close to the levels seen in 2003. The reported counts for the neurological syndrome ([Neurological Plot](#)) tended to be the lowest in the summer months while rash syndrome ([Rash Plot](#)) counts tended to be the highest in the summer months.

Because each count reported to the BTS system automatically generates a signal or flag, we cannot trend or track elevations for the chemical and hemorrhagic categories (see page 10).



## Section B - Communicable Disease Surveillance

There were two communicable diseases that affected Missourians in 2004 at levels that were outside of normal expectations: meningococcal disease and pertussis.

The good news in Missouri for 2004 was that reported cases of meningococcal disease were well below the normal expectancy for this condition. This could be due in part to the availability and use of the vaccine in high-risk persons combined with expeditious and aggressive investigations of each occurrence of disease. Military recruits, college students, and others living in crowded conditions are at a higher risk of acquiring infection.

The bad news in Missouri for 2004 was the continued rise in the number of pertussis (whooping cough) cases, particularly in the Northwest and Central Health Regions of the state. Pertussis has been on the increase in Missouri since 1998, and it has dramatically risen in the past three years. Furthermore, the increase for 2004 was unparalleled in Missouri and has more than tripled the next closest year's incidence rate for this condition. Additionally, pertussis incidence in 2004 has significantly increased within every age category, which is an unprecedented occurrence in Missouri. Health care providers should continue to be vigilant of patients who are presenting with long periods of unexplained cough and consider appropriate diagnostic testing of these persons.

Two types of spatially portrayed maps have been added on selected diseases to supplement the narrative this year. Spot maps have been included and show the locations of each case of disease within the state. The relative rate maps show how each jurisdiction was affected by disease as compared to the state as a whole. Separate links have been added for these maps, which can be viewed merely by clicking on them.

To improve our disease reporting system, health care providers, in cooperation with our local public agencies, are again encouraged to report conditions found in our communicable disease reporting rule, 19 CSR 20-20.020, to the Missouri Department of Health and Senior Services. The rule, in its entirety, can be found at:

<http://www.sos.mo.gov/adrules/csr/current/19csr/19c20-20.pdf>

## Section B - Communicable Disease Surveillance

### Campylobacteriosis



**Missouri Incidence.** Campylobacteriosis is one of the most common communicable diseases in Missouri. In 2004, there were 745 reported cases of confirmed or probable campylobacteriosis for a rate of 13.31 per 100,000 population (**Table 1B**). In comparison to combined 1999-2003 data, the rate of reported campylobacteriosis significantly increased by more than 20% ( $p < .001$ ).

Cases with reported socio-demographics showed a higher rate of reported campylobacteriosis for males than females (**Table 1B**). Whites, individuals less than 13 years of age, and the Southeast Health Region had the highest rates of campylobacteriosis for their respective socio-demographic. [NOTE: 53.8% of cases did not have a race designation. Ethnicity data was not reviewed due to a large number of cases with no information.]

In comparison to combined 1999-2003 data, the 2004 rate of reported campylobacteriosis significantly increased among males ( $p < .001$ ), females ( $p < .02$ ), and individuals aged less than 13 ( $p < .02$ ) and 30-39 ( $p < .01$ ) (**Table 1B**).

Additionally, the rate of reported campylobacteriosis significantly increased in the Southeast and Southwest ( $p < .02$ ) Health Regions. [NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 1B—Campylobacteriosis Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	745	13.31	11.09
SEX <sup>1</sup>			
<i>Male</i>	390	14.34	11.95
<i>Female</i>	352	12.24	10.17
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	332	6.89	1.60
<i>Black</i>	12	1.83	0.76
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	206	20.27	15.76
<i>13-19 yrs</i>	44	7.62	7.03
<i>20-29 yrs</i>	96	13.12	10.66
<i>30-39 yrs</i>	127	15.49	10.61
<i>40-49 yrs</i>	106	12.62	11.07
<i>50-59 yrs</i>	64	10.22	10.35
<i>60+ yrs</i>	94	9.56	8.70
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	139	9.53	8.32
<i>Eastern</i>	259	12.12	11.26
<i>Central</i>	70	11.27	10.14
<i>Southeast</i>	95	21.17	14.57
<i>Southwest</i>	182	19.59	15.05

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

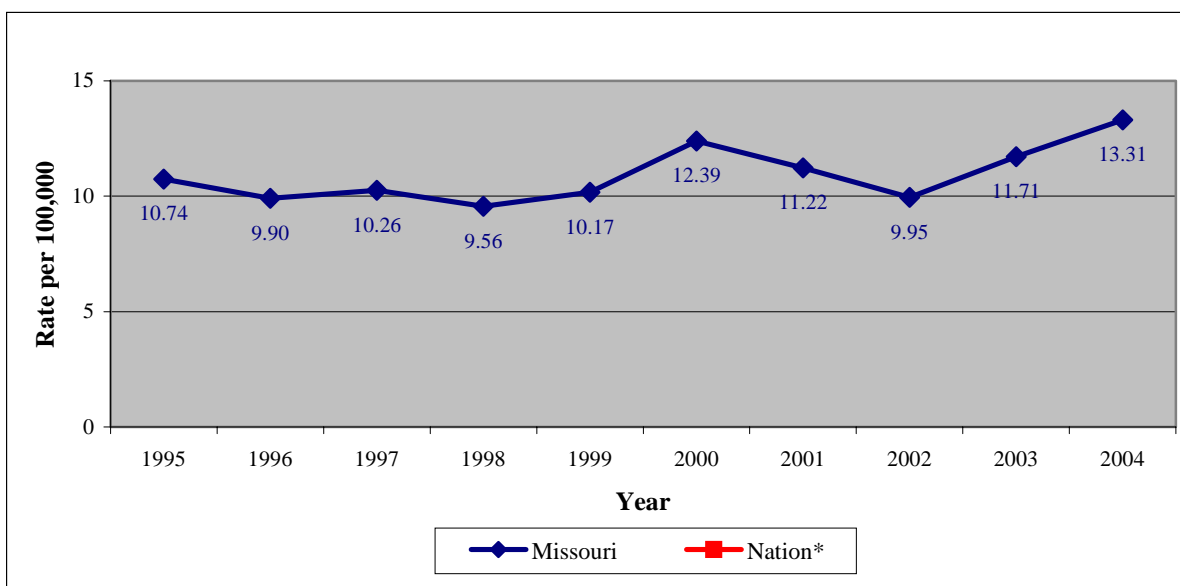




## Section B - Communicable Disease Surveillance

### Campylobacteriosis - Continued

**Comparison to National Data.** Campylobacteriosis is not a nationally reportable disease; therefore, no national data is available for comparison. Since 1995 the annual rate of reported campylobacteriosis in Missouri has remained relatively stable, fluctuating between 9.5 and 12.5 cases per 100,000 (**Figure 1B**), until 2004 when the rate increased to 13.31, which is the second consecutive year of an increase in incidence within Missouri.



**Figure 1B—Campylobacteriosis Rates of Reported Cases, Missouri versus United States, 1995-2004.**

\*Campylobacteriosis is not nationally notifiable therefore no data is available for comparison.

#### Additional Website Resources

[CDC Health Topics](#)

[CDIRM](#)

[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### Chlamydia

**Missouri Incidence.** In 2004, 21,319 cases of Chlamydia were reported in Missouri residents. Of these cases, 16,306 (76.4%) were in females. Furthermore, in the previous five years, females accounted for 83.3 percent of reported Chlamydia cases.

In 2004, as well as in each of the previous five years, African Americans had a higher number of cases than any other race. The 2004 case rate in African Americans was 1,426.4 per 100,000 population, which is more than ten times that of whites (125.2). It should be noted that race was not indicated in 5,043 (23.6%) cases during 2004 and, if race were to be determined in these cases, the resulting redistribution would be similar (**Table 2B**).

Demographically by age group, the highest case rates were found in the 15-19 and 20-24 groups (1,941.2 and 1,948.7) per 100,000 population, respectively), which are significantly higher ( $p < .001$ ) than their corresponding five-year mean rates. As with the data from the previous five years, persons aged 15-29 years had 88.3% of reported cases in 2004. This fact, paired with the high case counts in women, is worthy of note due to the reproductive health problems that can occur in women with Chlamydia infections. (**Table 2B**).

Geographically, St. Louis City reported 4,130 cases (19% of the state total) in 2004 with an associated case rate of 1,243.1 per 100,000 residents. In 2003, St. Louis City ranked 5<sup>th</sup> highest in Chlamydia case rates (1,035.0) in the nation within cities of more than 200,000 residents\*\*. Kansas City ranked eighth in the same study with a rate of 954.3 per 100,000 residents\*\*. Moreover, the 2003 case rates for both St. Louis City and Kansas City are higher than their 2002 totals. Case rates for each geographic region (**Table 2B**) have exceeded their corresponding five-year mean rates.

**Table 2B—Chlamydia Comparative Statistics, by Socio-demographic Category, Missouri**

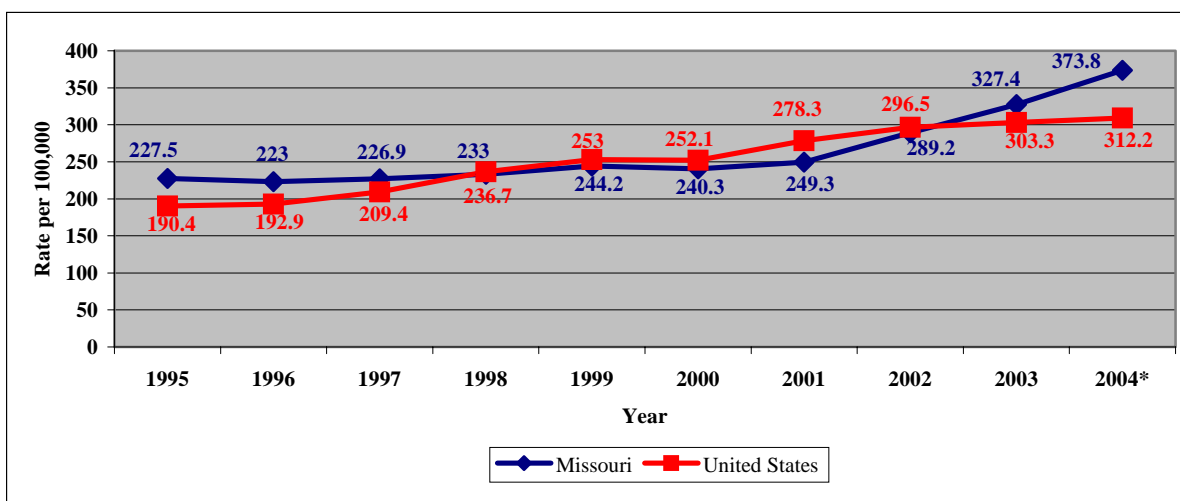
	2004 Case Count	2004 Case Rate <sup>1</sup>	5 year Mean Rate
<b>Race</b>			
American Indian/Eskimo	24	121.4	70.2
Asian/Pacific Islander	91	180.8	118.9
Black	9668	1,426.4	1049.4
White	6145	125.2	98.7
Other	348	738.3	454.6
Unknown	5043		
<b>Sex</b>			
Male	5013	180.2	92.7
Female	16306	558.1	437.6
<b>Age Group</b>			
<10	43	5.7	9.8
10 - 14	399	97.0	80.1
15 - 19	8011	1,941.2	1507.8
20 - 24	8021	1,948.7	1469.9
25 - 29	2798	781.8	475.7
30 - 34	1049	276.0	172.6
35 - 39	464	116.9	65.1
40 - 44	269	59.4	33.0
45 - 54	161	20.0	12.2
55 - 64	32	5.6	3.4
65 +	3	0.4	3.1
Unknown	69		
<b>Health Region</b>			
City of St. Louis	4130	1,243.1	901.8
St. Louis County	4005	395.5	272.9
Kansas City	4385	990.4	692.7
Outstate	8799	224.7	161.7
Missouri	21319	373.8	269.9

<sup>1</sup> All rates calculated using Missouri 2003 estimates via DHSS data per 100,000 population.

## Section B - Communicable Disease Surveillance

### Chlamydia - Continued

**Comparison to National Data.** Missouri's rate was higher than the national average from 1993 to 1997, less than or equal to the national rate from 1998 to 2002 and higher in both 2003 and possibly 2004. Missouri's 2004 provisional case rate was 373.8. This was higher than the national average of 312.2, and, once again, Missouri's rate appears to exceed the national rate for the second consecutive year and the gap between Missouri's rate and the national rate appears to be increasing (**Figure 2B**).



**Figure 2B—Chlamydia Rates of Reported Cases, Missouri versus United States, 1995-2004**

\*Provisional National Data (excluding U.S. Territories) as of May 31, 2005.

\*\*Data provided by the CDC- STD Surveillance 1998 - 2003.

#### Additional Website Resources

[CDC Health Topics](#)

[CDIRM](#)

[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### Cryptosporidiosis



**Missouri Incidence.** In 2004, there were 78 reported cases of confirmed or probable cryptosporidiosis for a rate of 1.39 per 100,000 population (**Table 3B**). In comparison to combined 1999-2003 data, the rate of reported cryptosporidiosis significantly increased by 90% ( $p < .001$ ). This increase could be due to improved diagnostic testing or reporting, greater exposure of persons to the organism due to outdoor activities or a combination of all of these. Alternatively, there could be a true increase in the rate.

Considering only those cases with reported socio-demographics, the 2004 rate of reported cryptosporidiosis was higher for females than males (**Table 3B**). Individuals less than 13 years of age, and the Southwest and Northwest Health Regions had the highest rates of cryptosporidiosis for their respective socio-demographic. [NOTE: 42.3% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported cryptosporidiosis increased significantly among females ( $p < .01$ ) and individuals aged 50-59 ( $p < .02$ ) (**Table 3B**). Additionally, the rate of reported cryptosporidiosis significantly increased in the Northwest ( $p < .02$ ), and Southwest ( $p < .01$ ) Health Regions. [NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 3B—Cryptosporidiosis Comparative Statistics, by Socio-demographic Category<sup>1</sup>,**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	78	1.39	0.73
SEX <sup>1</sup>			
<i>Male</i>	37	1.36	0.85
<i>Female</i>	41	1.43	0.63
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	43	0.89	0.32
<i>Black</i>	2	0.31	0.37
<i>Hispanic</i>	N/A	N/A	N/A
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	32	3.15	1.89
<i>13-19 yrs</i>	6	1.04	0.35
<i>20-29 yrs</i>	9	1.23	0.52
<i>30-39 yrs</i>	3	0.37	0.83
<i>40-49 yrs</i>	7	0.83	0.45
<i>50-59 yrs</i>	11	1.76	0.29
<i>60+ yrs</i>	10	1.02	0.37
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	23	1.58	0.62
<i>Eastern</i>	12	0.56	0.51
<i>Central</i>	6	0.97	0.39
<i>Southeast</i>	1	0.22	0.53
<i>Southwest</i>	36	3.88	1.77

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

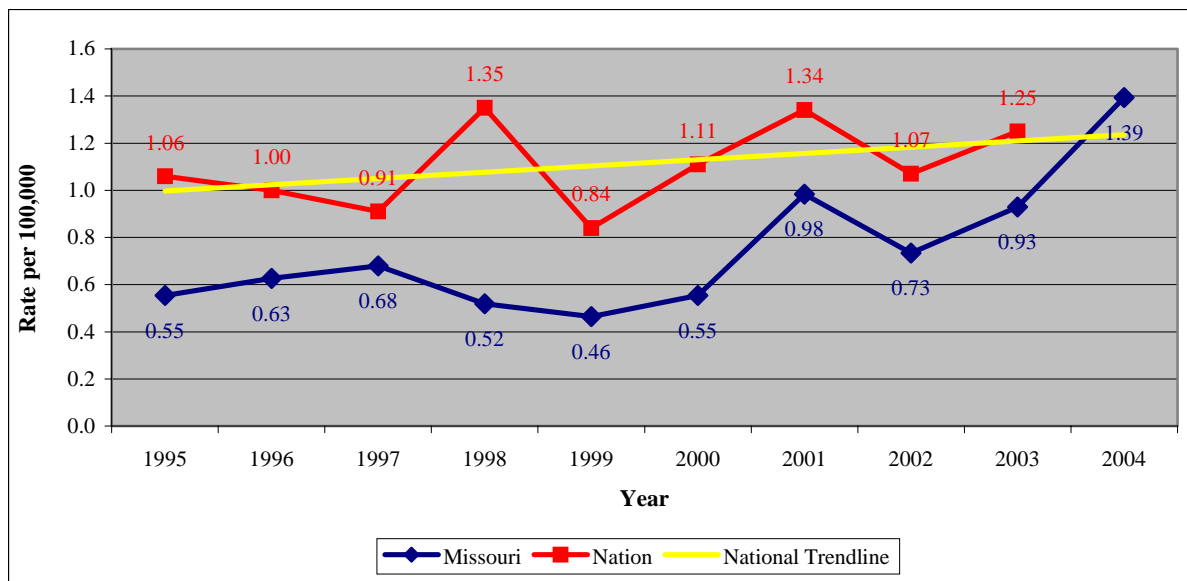
<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section B - Communicable Disease Surveillance

### Cryptosporidiosis - Continued

**Comparison to National Data.** The annual rate of reported cryptosporidiosis has fluctuated between 0.46 and 0.98 from 1995 to 2003. After declining to 0.73 in 2002, it has shown a steady increase for two years thereafter with the 2004 rate surpassing the highest national rate (1.35) from the previous nine years. Prior to this, Missouri's rate had been lower than the national rate for the past decade. However, based on the projected national trend, Missouri's rate appears to be on pace to slightly exceed the projected national rate in 2004 (**Figure 3B**).



**Figure 3B—Cryptosporidiosis Rates of Reported Cases, Missouri versus United States, 1995-2004**

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM](#)  
[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### Enterohemorrhagic *Escherichia Coli* (*E. Coli*)

#### *E. coli* O157:H7

#### *E. coli* Shiga Toxin + (Non O157)

#### *E. coli* Shiga Toxin + (Not Serogrouped)



#### *E. coli* O157:H7

**Missouri Incidence.** In 2004, there were 98 reported cases of confirmed or probable *E. coli* O157:H7 for a rate of 1.75 per 100,000 population (**Table 4B**). In comparison to combined 1999-2003 data, the 29% rate increase of reported *E. coli* O157:H7 was not significant.

Considering only those cases with reported socio-demographics, the 2004 rates of reported *E. coli* O157:H7 were higher for females than males (**Table 4B**). Whites had a significantly higher rate of *E. coli* O157:H7 than did African Americans ( $p < .02$ ). Additionally, individuals less than 13 years of age and the Southwest Health Region had the highest rates of *E. coli* O157:H7 for their respective socio-demographic. [NOTE: 39.8% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported *E. coli* O157:H7 significantly increased among individuals aged less than 13 ( $p < .02$ ) (**Table 4B**). The rate of reported *E. coli* O157:H7 was not significantly different within sex or any of the Health Regions ( $p < .001$ ). [NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 4B—*E. coli* O157:H7 Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
Total	98	1.75	1.35
SEX <sup>1</sup>			
Male	43	1.58	1.38
Female	55	1.91	1.32
RACE/ETHNICITY <sup>1,3</sup>			
White	58	1.20	0.90
Black	1	0.15	0.15
Hispanic	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
≤ 12 yrs	51	5.02	2.89
13-19 yrs	8	1.38	1.70
20-29 yrs	6	0.82	1.26
30-39 yrs	5	0.61	0.71
40-49 yrs	5	0.60	0.64
50-59 yrs	10	1.60	1.18
60+ yrs	13	1.32	0.83
HEALTH REGION <sup>1,4</sup>			
Northwest	31	2.12	1.19
Eastern	33	1.54	1.52
Central	11	1.77	1.19
Southeast	3	0.67	1.20
Southwest	20	2.15	1.33

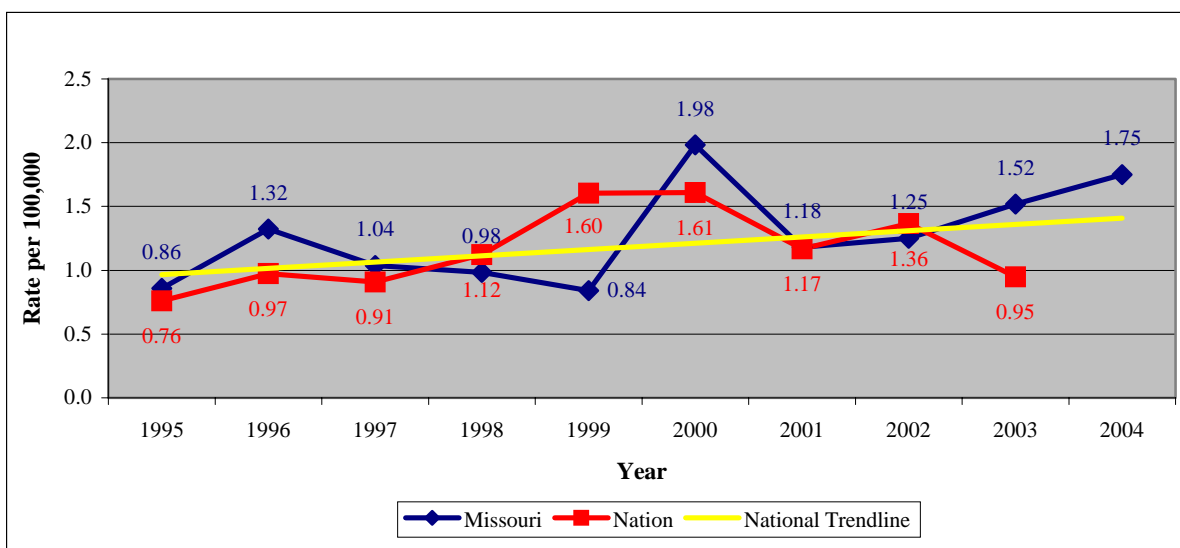
<sup>1</sup> Socio-demographic data are missing for some cases.  
<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.  
<sup>3</sup> Race/ethnicity categories are not mutually exclusive.  
<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.



## Section B - Communicable Disease Surveillance

### Enterohemorrhagic *Escherichia Coli* (*E. Coli*) - Continued

**Comparison to National Data.** Missouri's annual rate of reported *E. coli* O157:H7 fluctuated between 1995-2001 but has shown a steady increase thereafter (**Figure 4B**). Between 1995 and 2003 the national rate coincided with that of Missouri and the predicted trend is for the national rate to continue to do the same in 2004.



**Figure 4B—*E. coli* O157:H7 Rates of Reported Cases, Missouri versus United States, 1995-2004**

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM](#)  
[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### Enterohemorrhagic *Escherichia Coli* (*E. coli*) - Continued

#### *E. coli* Shiga Toxin + (Non O157) and *E. coli* Shiga Toxin + (Not Serogrouped)

In 2001, *E. coli* shiga toxin + (non O157) and *E. coli* shiga toxin + (not serogrouped) became nationally notifiable diseases as well as reportable within Missouri. In 2003, Missouri had its first reported cases of both of these conditions. *E. coli* shiga toxin + (non O157) had 20 cases for a rate of 0.36 per 100,000 population and *E. coli* shiga toxin + (not serogrouped) had one reported case for a rate of 0.10 per 100,000 population.

In 2004, there were 19 cases of *E. coli* shiga toxin + non O157 for a rate of 0.34 per 100,000 population. *E. coli* shiga toxin + (not serogrouped) had seven cases for a rate of 0.13 per 100,000 population.

#### Additional Website Resources

[CDC Health Topics](#)  
[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### Gonorrhea

**Missouri Incidence.** In 2004, 9,218 cases of Gonorrhea were reported in Missouri residents. Of these cases, 5,139 (55.7%) were in females. Furthermore, in the previous five years, females accounted for 53.0 percent of reported Gonorrhea cases.

In 2004, as well as in each of the previous five years, African Americans had a higher number of cases than any other race. The 2004 rate in African Americans was 884.8 per 100,000 population, which is about 30 times that of whites (29.9). It should be noted that race was not indicated in 1,654 (17.9%) cases during 2004 (**Table 5B**).

Demographically by age group, the highest rates were found in the 15-19 and 20-24 groups, which were 630.3 and 731.3 per 100,000 population, respectively, which are slightly below their respective five-year mean rates. As with the data for the previous five years, persons aged 15-29 years had 7,078 (76.8%) of the reported cases in 2004 (**Table 5B**). This fact, paired with the high case counts in women, is worthy of note due to the reproductive health problems that can occur in women with Gonococcal infections (**Table 5B**).

Geographically, St. Louis City reported 2,440 cases (26.5% of the state total) in 2004 with an associated case rate of 734.4 per 100,000 residents. In 2003, St. Louis City ranked first in Gonorrhea case rates (752.2) in the nation within cities of more than 200,000 residents\*\*. Kansas City ranked 7<sup>th</sup> in the same study with a rate of 559.1 per 100,000 residents\*\*. The 2004 case rate for St. Louis City is lower versus 2003; however, Kansas City's rate for 2004 has increased as compared to last year. Additionally, the case rate for St. Louis County is lower in 2004 than its corresponding five-year mean rate (**Table 5B**).

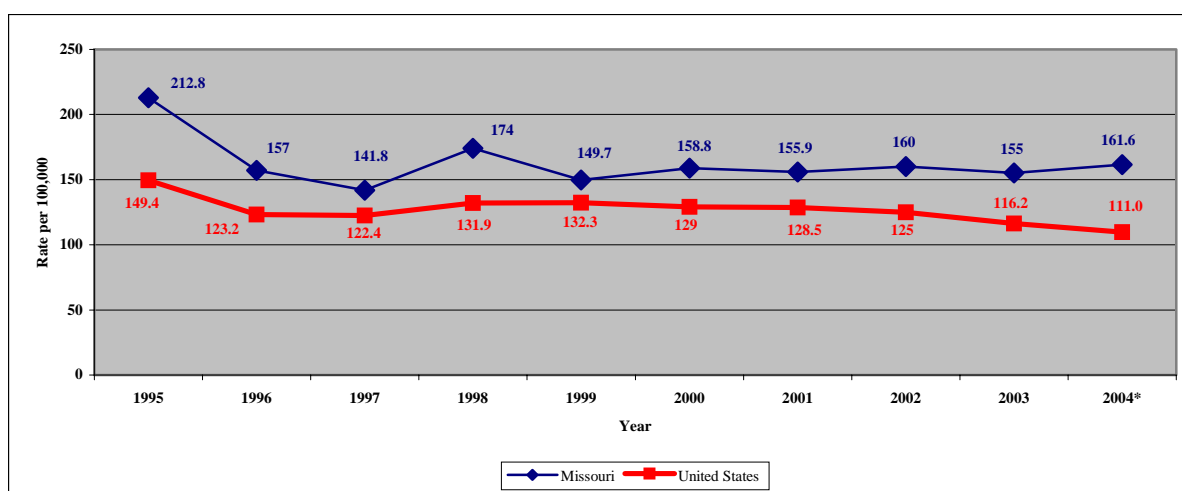
**Table 5B—Gonorrhea Comparative Statistics, by Socio-demographic Category, Missouri**

	2004 Case Count	2004 Case Rate <sup>1</sup>	5 year Mean Rate
Race			
American Indian/Eskimo	10	50.6	35.1
Asian/Pacific Islander	18	35.8	46.3
Black	5997	884.8	990.0
White	1468	29.9	23.8
Other	71	150.6	131.5
Unknown	1654		
Sex			
Male	4079	146.6	150.3
Female	5139	175.9	160.7
Age Group			
<10	10	1.3	4.6
10 - 14	169	41.1	35.6
15 - 19	2601	630.3	635.8
20 - 24	3010	731.3	738.5
25 - 29	1467	409.9	358.3
30 - 34	752	197.9	186.6
35 - 39	480	120.9	112.5
40 - 44	330	72.9	74.7
45 - 54	305	38.0	32.3
55 - 64	65	11.4	9.3
65 +	14	1.8	2.1
Unknown	15		
Health Region			
City of St. Louis	2440	734.4	816.9
St. Louis County	1843	182.0	175.0
Kansas City	2566	579.5	531.1
Outstate	2369	60.5	45.9
Missouri	9218	161.6	155.6
<i>1 All rates calculated using Missouri 2003 estimates via DHSS data per 100,000 population.</i>			

## Section B - Communicable Disease Surveillance

### Gonorrhea - Continued

**Comparison to National Data.** Missouri's rate for Gonorrhea has been higher than the national average from 1993 to present. Missouri's 2004 provisional case rate was 161.6, which is higher than the national average of 111.0. Once again, Missouri's rate will be higher than the national rate. (**Figure 5B**).



**Figure 5B—Gonorrhea Rates of Reported Cases, Missouri versus United States, 1995-2004**

\*Provisional National Data (excluding U.S. Territories) as of May 31, 2005.

\*\*Data provided by the CDC- STD Surveillance 1998 - 2003.

#### Additional Website Resources

[CDC Health Topics](#)

[CDIRM](#)

[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### Hemolytic Uremic Syndrome (HUS)

**Missouri Incidence.** In 2004, there were 19 reported cases of confirmed or probable HUS for a rate of 0.34 per 100,000 population (**Table 6B**). In comparison to combined 1999-2003 data, the rate of reported HUS significantly increased by 400% ( $p < .01$ ). Previously HUS morbidity was obscured by *E. coli* O157:H7 infections, as HUS can be a sequela to this infection; however, in 2004 emphasis was placed on identification and reporting of HUS as a distinctly separate condition. This might explain the significant increase in reported cases of HUS for 2004 in Missouri. However, there is also the possibility that this is a true increase in the rate.

Considering only those cases with reported socio-demographics, the 2004 rates of reported HUS were similar for males and females (**Table 6B**).

Among individuals who had demographic information available, all of the cases were white and most of the cases (89%) were in young children ( $\leq 12$  yrs). [NOTE: 8.2% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported HUS significantly increased among males ( $p < .01$ ), whites ( $p < .05$ ), and individuals aged less than 13 ( $p < .01$ ) (**Table 6B**).

**Table 6B—Hemolytic Uremic Syndrome (HUS) Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	19	0.34	0.07
SEX <sup>1</sup>			
<i>Male</i>	10	0.37	0.04
<i>Female</i>	9	0.31	0.10
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	11	0.23	0.06
<i>Black</i>	0	0.00	0.00
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
$\leq 12$ yrs	17	1.67	0.31
13-19 yrs	1	0.17	0.03
20-29 yrs	0	0.00	0.03
30-39 yrs	0	0.00	0.00
40-49 yrs	0	0.00	0.00
50-59 yrs	0	0.00	0.00
60+ yrs	1	0.10	0.02
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	3	0.21	0.01
<i>Eastern</i>	5	0.23	0.03
<i>Central</i>	3	0.48	0.26
<i>Southeast</i>	2	0.45	0.04
<i>Southwest</i>	6	0.65	0.13

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

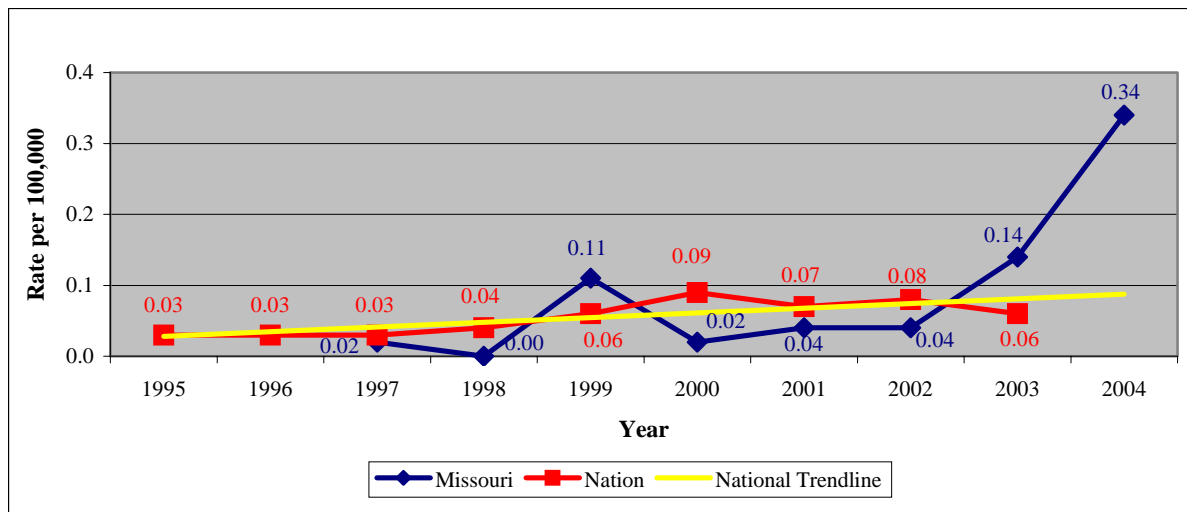
<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

Due to a small number of cases, no significant changes in the rate of reported HUS were observed in any of the Health Regions. [NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for ethnicity.]

## Section B - Communicable Disease Surveillance

### Hemolytic Uremic Syndrome (HUS) - Continued

**Comparison to National Data.** Missouri's annual rate of reported HUS remained generally steady between 1997-2002 but has increased an average of 65% since then (**Figure 6B**). Between 1997 and 2002, the national rate coincided with that of Missouri. However, with increased incidence in 2003 and 2004 and the national trend projected to remain stable, Missouri's rate could surpass the national rate by more than 70% in 2004.



**Figure 6B—Hemolytic Uremic Syndrome (HUS) Rates of Reported Cases, Missouri versus United States, 1995-2004**

\*No Missouri data available for 1995 & 1996

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM](#)  
[Health Region Defined](#)





## Section B - Communicable Disease Surveillance

### HIV Disease

In 2004, 467 newly diagnosed HIV Disease cases were reported in Missouri residents. Of these, males represented 78.6% (367 cases). This is consistent with percentages in the last several years.

The 2004 case rate for African Americans was 33.2 per 100,000 in population (**Table 7B**). This is almost seven times higher than the case rate in whites (4.9). The case rate in Hispanic persons, 6.7, is notably lower than the mean rate from the previous five-year period (12.1 cases per 100,000). Case counts in African American females are noteworthy this year. Whereas only 11.6% of the females in Missouri are African American, they represent 61% of the new HIV disease cases in females. The case rate in white females was 1.4 per 100,000 population; however, the case rate in African American females was over thirteen times greater, at 18.9 per 100,000.

Persons aged 20-39 years had a case count reported of 287, which accounts for more than 60% of the reported cases in 2004, whereas this age group accounts for approximately 27.7% of the overall population.

**Table 7B—HIV Comparative Statistics, by Socio-demographic Category\*, Missouri**

	2004 Cases	2004 Rate*	5 Year Mean Rate*
<b>Race</b>			
White	231	4.9	5.3
Black	209	33.2	40.0
Hispanic	8	6.7	12.1
Other/ Unknown	19	19.2	12.1
<b>Sex</b>			
Male	367	13.5	15.4
Female	100	3.5	3.8
<b>Age Group</b>			
<13	0	0.0	0.4
13-19	11	1.9	2.9
20-29	146	20.0	19.2
30-39	141	17.2	23.4
40-49	123	14.6	15.2
50+	46	2.9	2.9
<b>Region**</b>			
St. Louis Region	217	10.8	13.3
Kansas City Region	143	12.4	12.2
North Central Region	21	3.0	3.6
Northwest Region	3	1.2	1.5
Southeast Region	8	1.7	3.2
Southwest Region	33	3.3	4.1
Correctional Facilities	42	#	#

\*Per 100,000 population, based on Census 2000 data

\*\*HIV Regions differ from MDHSS Reporting Regions

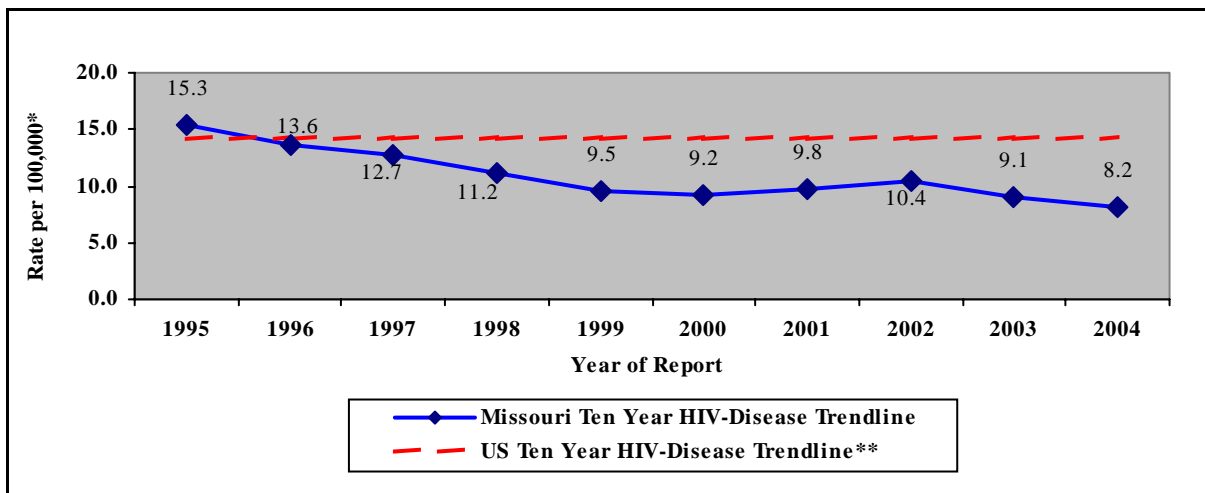
#Population estimates for correctional facilities are unavailable

The St. Louis Region (a seven county area including St. Louis City and St. Louis County) and the Kansas City Region (a ten-county area containing all of the Kansas City metropolitan area) reported the vast majority of the cases (77.1%) in 2004. The St. Louis and Kansas City HIV Regions had case rates in 2004 that were 1.3 and 1.5 times higher than the state rate, respectively. Though persons in correctional facilities account for approximately 0.7% of Missouri's population, nearly 9% of the cases reported in 2004 occurred in persons housed in correctional facilities at the time of diagnosis.

## Section B - Communicable Disease Surveillance

### HIV Disease - Continued

Since 1996, Missouri's HIV Disease case rate has been below the CDC national estimated case rate of 14.2 per 100,000 in population. Recent years have shown notable variations in incidence rates (**Figure 7B**). From 1995 through 2000 the rate of infections was consistently decreasing. In 2001 and 2002, Missouri saw increases in reported cases; however, the number of incident case rate has decreased each year since 2002. Without adjusting for potential reporting delays (as much as 20% in some estimations), Missouri realized the fewest number of reported HIV Disease cases in 2004 since HIV (non-AIDS) reporting was added to Missouri's communicable disease reporting rule in 1987.



**Figure 7B—HIV Disease Rates of Reported Cases, Missouri versus United States, 1995-2004.**

\*Population based on MDHSS estimates for Missouri and Census 2000 for the United States

\*\*As some states do not require HIV reporting, CDC estimates 40,000 new HIV Infections annually

#### Additional Website Resources

[CDC-HIV/AIDS Prevention](#)  
[CDC-Global AIDS Program \(GAP\)](#)  
[State Health Facts](#)  
[HIV/AIDS in the U.S.](#)  
[HIV/AIDS Epidemiologic Profiles](#)



## Section B - Communicable Disease Surveillance

[Click to View](#)

[Spot Map](#)  
[Relative Rate Map](#)

### Meningococcal Disease

**Missouri Incidence.** In 2004, there were 20 reported cases of confirmed or probable meningococcal disease for a rate of 0.36 per 100,000 population (**Table 8B**). In comparison to combined 1999-2003 data, the rate of reported meningococcal disease significantly decreased by 69% ( $p<.001$ ). This decrease may be attributed to a combination of aggressive case investigation combined with a vaccine that provides protection against one of the meningococcal strains. In 2000, ACIP and the American College Health Association suggested education of students and parents about the use of this vaccine.

Considering only those cases with reported socio-demographics, the 2004 rate of reported meningococcal disease was higher for males than females (**Table 8B**). African Americans had a rate of meningococcal disease almost 2.5 times higher than that of whites. Individuals aged less than 13 years, and the Eastern Health Region had the highest rates of meningococcal disease for their respective socio-demographic. [NOTE: 40% of cases did not have a race designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported meningococcal disease significantly decreased among males ( $p<.01$ ) and females ( $p<.001$ ) and individuals aged less than 13 ( $p<.01$ ), 30-39 ( $p<.02$ ), and 60+ ( $p<.05$ ) (**Table 8B**). Additionally, the rate of reported meningococcal disease significantly decreased in the Northwest ( $p<.05$ ), Eastern ( $p<.01$ ) and Southwest ( $p<.05$ ) Health Regions. [NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 8B—Meningococcal Disease Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	20	0.36	1.14
SEX <sup>1</sup>			
<i>Male</i>	12	0.44	1.17
<i>Female</i>	8	0.28	1.11
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	9	0.19	0.72
<i>Black</i>	3	0.46	0.76
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	8	0.79	2.54
<i>13-19 yrs</i>	4	0.69	1.49
<i>20-29 yrs</i>	3	0.41	1.09
<i>30-39 yrs</i>	0	0.00	0.68
<i>40-49 yrs</i>	2	0.24	0.36
<i>50-59 yrs</i>	0	0.00	0.42
<i>60+ yrs</i>	3	0.30	1.06
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	4	0.27	0.89
<i>Eastern</i>	10	0.47	1.39
<i>Central</i>	2	0.32	0.87
<i>Southeast</i>	0	0.00	0.67
<i>Southwest</i>	4	0.43	1.31

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

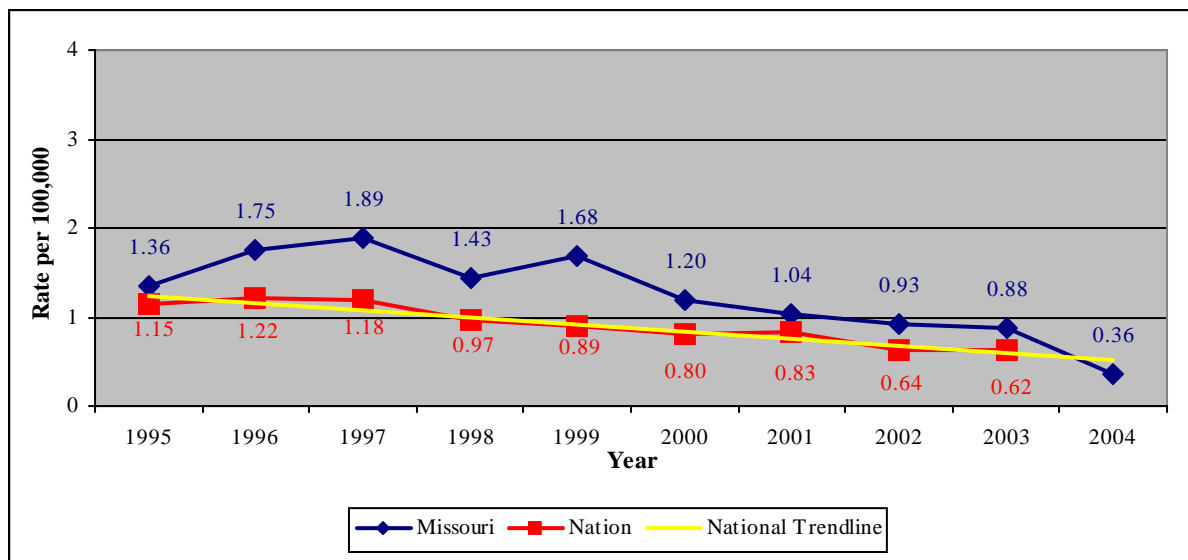
<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section B - Communicable Disease Surveillance

### Meningococcal Disease - Continued

**Comparison to National Data.** Missouri's rate of reported meningococcal disease declined by 52% between 1999 to 2003 (**Figure 8B**). Since 2000, Missouri's trend was very similar to the national rate, which was also declining. Although similar in their decline, Missouri's rate has still remained above the national rate. Additionally, Missouri's incidence showed a significant ( $p<.001$ ) decrease of 59% between 2003 to 2004. Based on the national trend line (**Figure 8B**) it is possible that, for the first time in 10 years, Missouri's rate could be below the national rate.



**Figure 8B—Meningococcal Disease Rates of Reported Cases, Missouri versus United States, 1995-2004.**

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM](#)  
[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### Pertussis



**Missouri Incidence.** Pertussis (whooping cough) is one of the most common communicable diseases in Missouri. In 2004, there were 595 reported cases of confirmed or probable pertussis for a rate of 10.63 per 100,000 population (**Table 9B**). In comparison to combined 1999-2003 data, the rate of pertussis significantly increased by 369% ( $p < .001$ ). This increase may be due to a combination of several factors including waning vaccine protection in adolescents and the insidious nature of adult disease. Adult disease does not normally present with the classic “whoop” as it does in children; therefore, many cases of adult disease often go undiagnosed.

Considering only those cases with reported socio-demographics, the 2004 rate of reported pertussis was higher for females than males ( $p < .01$ ) (**Table 9B**). Whites, individuals aged less than 13 years, and the Central Health Region had the highest rates of pertussis for their respective socio-demographic. [NOTE: 21.3% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported pertussis significantly increased among both males ( $p < .001$ ) and females ( $p < .001$ ) and among individuals in all age groups (**Table 9B**). Additionally, the rate of reported pertussis significantly increased in the Northwest ( $p < .001$ ), Central ( $p < .001$ ), Southeast ( $p < .01$ ), and Southwest ( $p < .01$ ) Health Regions.

[NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 9B—Pertussis Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

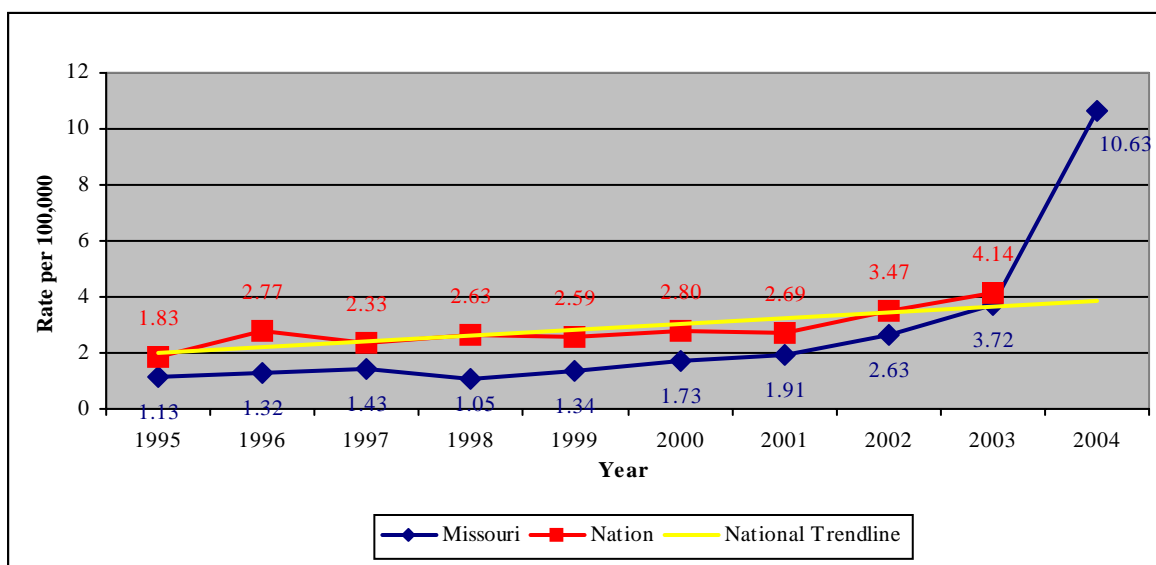
	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	595	10.63	2.27
SEX <sup>1</sup>			
<i>Male</i>	256	9.41	2.12
<i>Female</i>	338	11.76	2.39
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	437	9.07	1.95
<i>Black</i>	31	4.73	2.78
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	347	34.14	9.94
<i>13-19 yrs</i>	120	20.77	2.04
<i>20-29 yrs</i>	29	3.96	0.46
<i>30-39 yrs</i>	45	5.49	0.46
<i>40-49 yrs</i>	33	3.93	0.48
<i>50-59 yrs</i>	10	1.60	0.35
<i>60+ yrs</i>	9	0.91	0.04
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	293	20.08	3.43
<i>Eastern</i>	63	2.95	2.29
<i>Central</i>	191	30.75	1.67
<i>Southeast</i>	25	5.57	2.14
<i>Southwest</i>	23	2.48	0.84

<sup>1</sup> Socio-demographic data are missing for some cases.  
<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.  
<sup>3</sup> Race/ethnicity categories are not mutually exclusive.  
<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section B - Communicable Disease Surveillance

### Pertussis - Continued

**Comparison to National Data.** Since 1995, Missouri's rate of reported pertussis has consistently increased (**Figure 9B**). Missouri had a sharp increase in pertussis cases overall in 2004. Although national data is not yet available for comparison, if national incidence follows the trend it has for the previous nine years (**Figure 9B**), Missouri's rate could exceed the national rate dramatically in 2004.



**Figure 9B—Pertussis Rates of Reported Cases, Missouri versus United States, 1995-2004**

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM](#)  
[Health Region Defined](#)





## Section B - Communicable Disease Surveillance

### Rabies, Animal



**Missouri Incidence.** In 2004, there were 59 reported cases of confirmed Animal Rabies in Missouri (**Table 10B**). This is the highest number of reported cases in the past 15 years. This is also the highest percentage of positive rabies in comparison to the number of specimens submitted for testing since 1995.

Considering all of the reported cases of positive animal rabies in 2004, the Southwest Health Region had the highest percentage of reported cases in comparison to the number of specimens submitted with the Eastern Health Region a distant second (**Table 10B**).

The majority of the positive reported cases occurred in wild animal specimens. Bats and skunks were the two species that accounted for 57 of the 59 cases. The other two cases occurred in domestic animals in which one dog and one goat were rabid.

**Table 10B—Rabies, Animal, Comparative Statistics for Incidence of Confirmed Rabies and Number of Specimens Tested, Missouri**

2004 Case Count			
Species	Specimens Tested	Positive Results	Percent Positive
Dog	636	1	0.16
Cat	613	0	0.00
Bat	746	38	5.09
Skunk	45	19	42.20
Fox	9	0	0.00
Cow	18	0	0.00
Horse	10	0	0.00
Raccoon	99	0	0.00
Rodent/Rabbit	117	0	0.00
Other Domestic	9	1 (Goat)	11.11
Other Wild	50	0	0.00
HEALTH REGION <sup>1</sup>			
<i>Northwest</i>	531	10	1.88
<i>Eastern</i>	859	24	2.79
<i>Central</i>	436	7	1.61
<i>Southeast</i>	155	13	8.39
<i>Southwest</i>	367	5	1.36
<i>1 There were 2,352 total specimens submitted; 4 were missing regional data</i>			



## Section B - Communicable Disease Surveillance

### Rabies, Animal - Continued

**Missouri Trend Data.** In comparison to rabies data from 1995-2003, 2004 was very similar in the percentage of wild animal positives compared to domestic animals. It was also very similar in the species that make up the wild animal positive cases. With the exception of a positive fox in 2001 and a positive raccoon in 1999, all of the 2004 wild positive rabies cases occurred in bats and skunks.

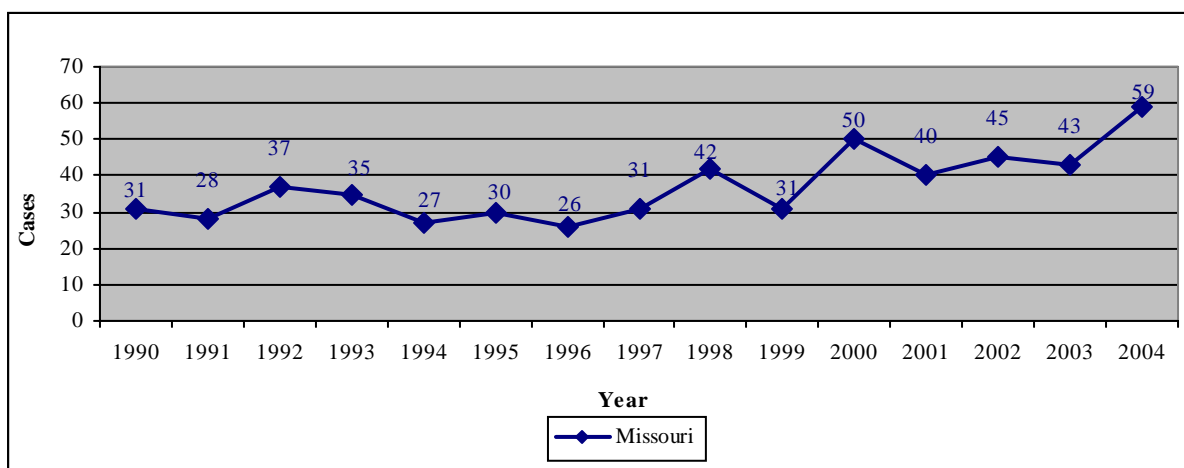


Figure 10B—Rabies, Animal, Case Counts of Wild Animal Positives, Missouri, 1990-2004

#### Additional Website Resources

[CDC Health Topics](#)

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## Section B - Communicable Disease Surveillance

### Salmonellosis



**Missouri Incidence.** Salmonellosis is one of the most common communicable diseases in Missouri. In 2004, there were 628 reported cases of confirmed or probable salmonellosis for a rate of 11.22 per 100,000 population (**Table 11B**). In comparison to combined 1999-2003 data, the rate of salmonellosis significantly decreased by 18% ( $p < .001$ ).

Considering only those cases with reported socio-demographics, the 2004 rate of reported salmonellosis was slightly higher for females than males (**Table 11B**). African Americans and whites had similar rates of salmonellosis. Individuals aged less than 13 years and the Southeast Health Region had the highest rates of salmonellosis for their respective socio-demographic. [NOTE: 56.7% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported salmonellosis significantly decreased among both males ( $p < .02$ ) and females ( $p < .01$ ) and among individuals aged less than 13 years ( $p < .01$ ) (**Table 11B**). Additionally, the rate of reported salmonellosis significantly decreased in the Northwest ( $p < .01$ ) and Central ( $p < .01$ ) Health Regions. [NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 11B—Salmonellosis Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	628	11.22	13.69
SEX <sup>1</sup>			
<i>Male</i>	289	10.62	12.93
<i>Female</i>	336	11.69	14.23
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	239	4.96	5.81
<i>Black</i>	33	5.04	7.20
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>&lt; 12 yrs</i>	230	22.63	28.47
<i>13-19 yrs</i>	49	8.48	9.14
<i>20-29 yrs</i>	66	9.02	11.67
<i>30-39 yrs</i>	65	7.93	9.64
<i>40-49 yrs</i>	74	8.81	9.74
<i>50-59 yrs</i>	47	7.51	9.81
<i>60+ yrs</i>	93	9.45	10.33
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	123	8.43	11.49
<i>Eastern</i>	268	12.54	14.24
<i>Central</i>	53	8.53	13.78
<i>Southeast</i>	83	18.49	21.03
<i>Southwest</i>	101	10.87	11.52

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

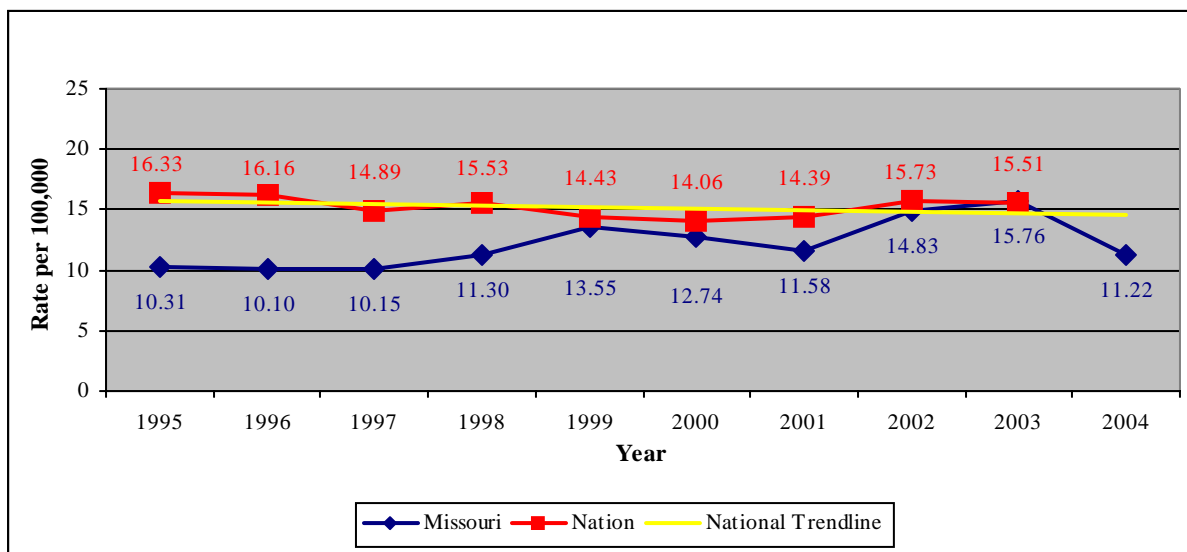
<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section B - Communicable Disease Surveillance

### Salmonellosis - Continued

**Comparison to National Data.** Since 1995, Missouri's annual rate of reported salmonellosis has generally increased (**Figure 11B**), although in 2004 there was a significant decrease. From 1995-2003 Missouri's rate of reported salmonellosis was on average 27% lower than the national. In comparison to the national trend (**Figure 11B**) this difference should remain consistent in 2004.



**Figure 11B—Salmonellosis Rates of Reported Cases, Missouri versus United States, 1995-2004**

#### Additional Website Resources

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## Section B - Communicable Disease Surveillance

### Shigellosis



**Missouri Incidence.** In 2004, there were 184 reported cases of confirmed or probable shigellosis for a rate of 3.29 per 100,000 population (**Table 12B**). In comparison to combined 1999-2003 data, the rate of shigellosis significantly decreased by 60% ( $p < .001$ ).

Considering only those cases with reported socio-demographics, the 2004 rate of reported shigellosis was slightly more than 12% higher for females than males but not significantly higher (**Table 12B**). African Americans ( $p < .01$ ) had a significantly higher rate of shigellosis than did whites. Individuals aged less than 13 years and the Southwest Health Region had the highest rates of shigellosis for their respective socio-demographic. [NOTE: 64% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported shigellosis significantly decreased among males ( $p < .001$ ), females ( $p < .001$ ) and among individuals aged less than 13 years ( $p < .001$ ), 20-29 ( $p < .01$ ), 30-39 ( $p < .01$ ), and 40-49 ( $p < .001$ ) (**Table 12B**). The rate for African Americans and whites also significantly decreased ( $p < .001$ ). Additionally, the rates of reported shigellosis significantly decreased ( $p < .001$ ) in all but the Southwest Health Region. [NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for ethnicity.]

**Table 12B—Shigellosis Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	184	3.29	8.17
SEX <sup>1</sup>			
<i>Male</i>	80	2.94	7.26
<i>Female</i>	97	3.37	8.81
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	52	1.08	2.29
<i>Black</i>	15	2.29	11.54
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	107	10.53	28.12
<i>13-19 yrs</i>	12	2.08	3.63
<i>20-29 yrs</i>	27	3.69	6.83
<i>30-39 yrs</i>	16	1.95	4.73
<i>40-49 yrs</i>	4	0.48	2.48
<i>50-59 yrs</i>	10	1.60	2.01
<i>60+ yrs</i>	5	0.51	1.26
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	55	3.77	6.54
<i>Eastern</i>	72	3.37	12.04
<i>Central</i>	6	0.97	4.35
<i>Southeast</i>	1	0.22	4.06
<i>Southwest</i>	50	5.38	6.24

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.



## Section B - Communicable Disease Surveillance

### Shigellosis - Continued

**Comparison to National Data.** Missouri's annual rate of reported shigellosis has fluctuated greatly since 1995; yet it has generally decreased since 1999 (**Figure 12B**). Unlike Missouri's rate of reported shigellosis, the national rate has remained fairly stable but with a slight increase since 1999. Missouri's rate appears to be comparable in 2004 with the predicted national rate (**Figure 12B**).

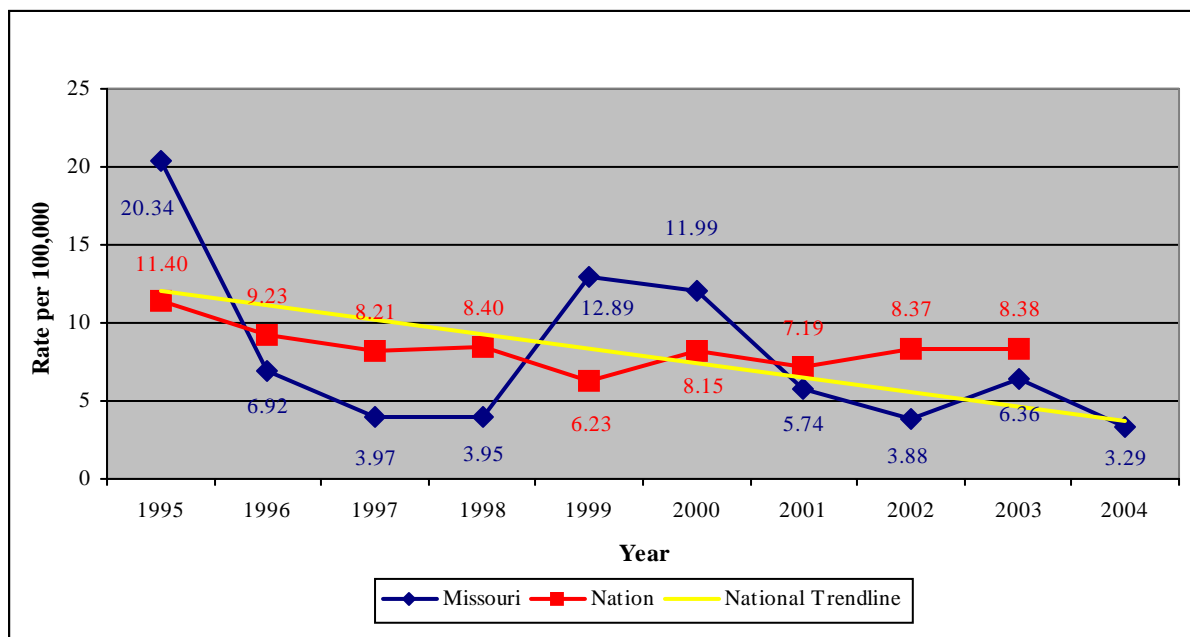


Figure 12B—Shigellosis Rates of Reported Cases, Missouri versus United States, 1995-2004

#### Additional Website Resources

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## Section B - Communicable Disease Surveillance

### Streptococcal Disease, Invasive, Group A (GAS)



**Missouri Incidence.** In 2004, there were 62 reported cases of confirmed or probable GAS for a rate of 1.11 per 100,000 population (**Table 13B**).

In comparison to combined 1999-2003 data, GAS did not show a significant change although the rate of reported GAS decreased by 26% (**Table 13B**).

Considering only those cases with reported socio-demographics, the 2004 rates of reported of GAS were similar between the sexes. The rates were 20% higher for whites than for African Americans (**Table 13B**).

Individuals aged 60+ years had higher rates of GAS than did the other age groups and the Northwest Health Region had the highest regional rate (**Table 13B**).

[NOTE: 50% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported GAS showed no significant rate change for sex, age, or geographic region (**Table 13B**).

[NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 13B—Streptococcal Disease, Invasive, Group A (GAS), Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	62	1.11	0.88
SEX <sup>1</sup>			
<i>Male</i>	29	1.07	1.12
<i>Female</i>	33	1.15	1.09
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	28	0.58	0.71
<i>Black</i>	3	0.46	0.70
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	16	1.57	0.85
<i>13-19 yrs</i>	4	0.69	0.17
<i>20-29 yrs</i>	4	0.55	0.55
<i>30-39 yrs</i>	8	0.98	0.78
<i>40-49 yrs</i>	6	0.71	0.83
<i>50-59 yrs</i>	5	0.80	1.50
<i>60+ yrs</i>	19	1.93	2.52
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	25	1.71	1.64
<i>Eastern</i>	27	1.26	1.04
<i>Central</i>	1	0.16	0.80
<i>Southeast</i>	4	0.89	0.27
<i>Southwest</i>	5	0.54	1.01

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

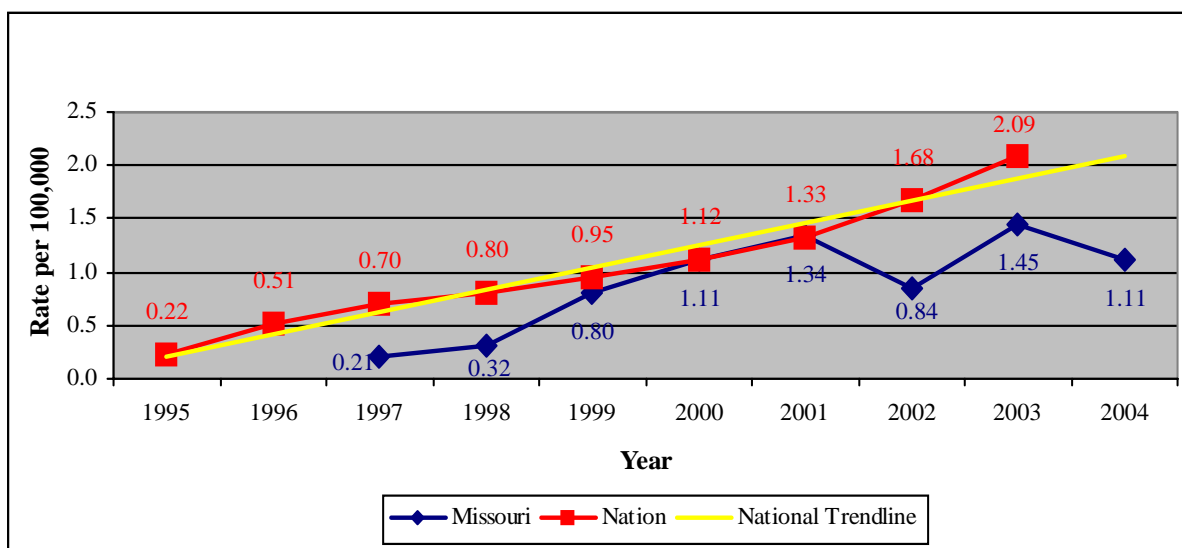
<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.



## Section B - Communicable Disease Surveillance

### Streptococcal Disease, Invasive, Group A (GAS) - Continued

**Comparison to National Data.** From 1997-2003 Missouri's annual rate of GAS generally increased with the exception of 2002 when there was an approximately 37% decrease in incidence (**Figure 13B**). Between 1999-2001, Missouri's rate of reported GAS was almost identical to the national rate; however, since 2002, the national rate has exceeded Missouri's. In 2004, according to the projected trend (**Figure 13B**), the Missouri rate should once again be lower than the national rate.



**Figure 13B—Streptococcal Disease, Invasive, Group A (GAS), Rates of Reported Cases, Missouri versus United States, 1995-2004**

\*No Missouri data available for 1995 & 1996.

#### Additional Website Resources

[CDC Health Topics](#)  
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## Section B - Communicable Disease Surveillance

### *Streptococcus pneumoniae*, Drug Resistant (DRSP)



**Missouri Incidence.** There were 20 confirmed or probable reported cases of DRSP in 2004 for a rate of 0.36 per 100,000 population (**Table 14B**). In comparison to combined 1999-2003 data, the rate of reported DRSP significantly increased by 194% ( $p<.001$ ).

Considering only those cases with reported socio-demographics, the 2004 rates of reported DRSP were similar for males and females (**Table 14B**).

Whites, individuals aged 50 years and over, and the Northwest and Southeast Health Regions had the highest rates of DRSP for their respective socio-demographic (**Table 14B**).

[NOTE: 25% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported DRSP significantly increased among males ( $p<.05$ ) (**Table 14B**). There were no significant changes within any of the age groups or Health Regions.

[NOTE: Due to missing data, 2004 data were not compared to 1999-2003 for race/ethnicity.]

**Table 14B—*Streptococcus pneumoniae*, Drug Resistant (DRSP), Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	20	0.36	0.12
SEX <sup>1</sup>			
<i>Male</i>	10	0.37	0.09
<i>Female</i>	10	0.35	0.15
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	14	0.29	0.11
<i>Black</i>	1	0.15	0.06
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	3	0.30	0.16
<i>13-19 yrs</i>	1	0.17	0.00
<i>20-29 yrs</i>	2	0.27	0.05
<i>30-39 yrs</i>	2	0.24	0.05
<i>40-49 yrs</i>	2	0.24	0.07
<i>50-59 yrs</i>	5	0.80	0.10
<i>60+ yrs</i>	5	0.51	0.33
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	5	0.34	0.25
<i>Eastern</i>	3	0.14	0.06
<i>Central</i>	7	1.13	0.23
<i>Southeast</i>	2	0.45	0.00
<i>Southwest</i>	3	0.32	0.06

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

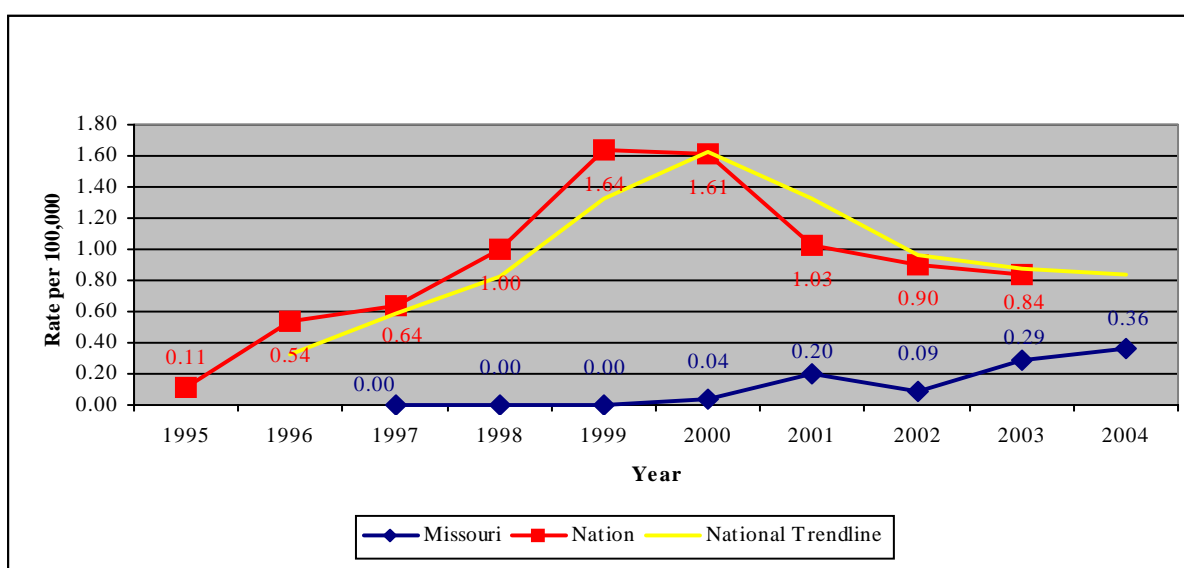
<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section B - Communicable Disease Surveillance

### *Streptococcus pneumoniae*, Drug Resistant (DRSP) - Continued

**Comparison to National Data.** Nationally, the rates increased from 1995 to 1999 and have declined since 2000 (**Figure 14B**). However, the Missouri rate has been increasing since 1999. Although the Missouri rate has consistently been lower than the national rate, if the current trend continues, the Missouri rate could equal the national rate in the future.



**Figure 14B—*Streptococcus pneumoniae*, Drug Resistant (DRSP), Rates of Reported Cases, Missouri versus United States, 1995-2004**

#### Additional Website Resources

[CDC Health Topics](#)  
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## Section B - Communicable Disease Surveillance

### Syphilis, Primary & Secondary

**Missouri Incidence.** In 2004, 94 cases of Primary & Secondary Syphilis were reported in Missouri residents. Of these cases, 82 (87%) were in males.

In 2004, as well as in each of the previous five years, African Americans had a higher rate than other races. The 2004 case rate in African Americans was 4.7 per 100,000 population, which is over three times that of whites (1.3). It should be noted that race was indicated in 100% of the cases during 2003. (**Table 15B**).

Of all age groups, the highest case rate was found in the 30-34 age group, at 5.8 per 100,000, and 40-44 age group at a 4.4 case rate, which is higher than their corresponding five-year mean rates. Persons aged 30-44 years had 55 (59%) reported cases in 2004, whereas in the previous five years, persons in the 30-44 age groups accounted for an average of 43.5% of the reported cases. This indicates that infection among younger individuals is increasing (**Table 15B**).

Geographically, St. Louis City reported 47 cases (50% of all cases in the state) in 2004 with an associated case rate of 14.1 per 100,000 residents. In 2003, St. Louis City ranked 23rd in Primary & Secondary case rates (5.3) in the nation within cities with more than 200,000 residents\*\*. Kansas City ranked 30th in the 2003 study with a rate of 4.2 per 100,000 residents\*\*. In 2004, the case rates for both St. Louis City and Kansas City are higher than their 2003 respective rates. The case rates in 2004 for St. Louis City and Kansas City were more than twice their corresponding five-year mean rates (**Table 15B**).

**Table 15B—Syphilis, Primary & Secondary, Comparative Statistics, by Socio-demographic Category, Missouri**

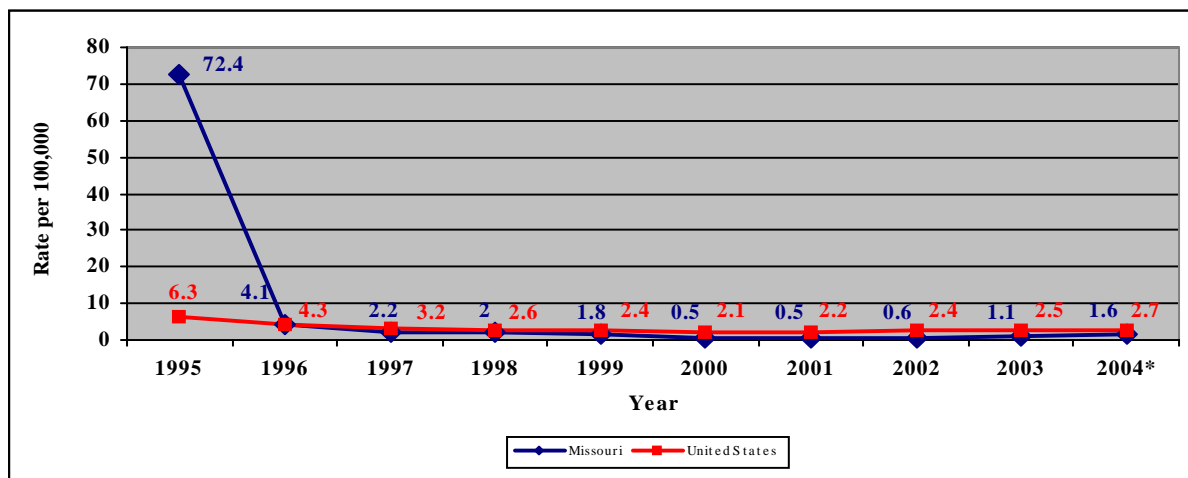
	2004 Case Count	2004 Case Rate <sup>1</sup>	5 year Mean Rate
<b>Race</b>			
American Indian/Eskimo			
Asian/Pacific Islander			
Black	32	4.7	5.0
White	62	1.3	0.3
Other			
Unknown			
<b>Sex</b>			
Male	82	2.9	1.1
Female	12	2.9	0.6
<b>Age Group</b>			
<10			0.1
10 - 14			0.0
15 - 19	3	0.7	1.1
20 - 24	10	2.4	2.3
25 - 29	13	3.6	1.3
30 - 34	22	5.8	1.7
35 - 39	13	3.3	2.0
40 - 44	20	4.4	1.4
45 - 54	11	1.4	1.1
55 - 64	2	0.4	0.3
65 +			0.0
Unknown			
<b>Health Region</b>			
City of St. Louis	47	14.1	6.2
St. Louis County	8	0.8	1.1
Kansas City	23	5.2	1.8
Outstate	16	0.4	0.2
Missouri	94	1.6	0.9

<sup>1</sup> All rates calculated using Missouri 2003 estimates via DHSS data per 100,000 population.

## Section B - Communicable Disease Surveillance

### Syphilis, Primary & Secondary - Continued

**Comparison to National Data.** Comparing Missouri's case rate with the national average rate, Missouri has had a lower rate from 1996 to present; however, prior to 1996, Missouri's rate was higher than the national rate. For 2004, Missouri's Primary & Secondary case rate was 1.6 and the provisional national case rate was 2.7; therefore, Missouri's rate is projected to be below the national rate for 2004 (**Figure 15B**).



**Figure 15B—Primary and Secondary Syphilis Rates of Reported Cases, Missouri versus United States, 1995-2004**

\*Provisional National Data (excluding U.S. Territories) as of May 31, 2005.

\*\*Data provided by the CDC- STD Surveillance 1998 - 2003.

#### Additional Website Resources

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## Section B - Communicable Disease Surveillance

### Tuberculosis Disease

**Missouri Incidence.** There were 127 reported cases of confirmed tuberculosis disease in 2004 for a rate of 2.27 per 100,000 population (**Table 16B**). In comparison to combined 1999-2003 data, the rate of tuberculosis disease significantly decreased by 25% ( $p < .02$ ).

Considering only those cases with reported socio-demographics, the 2004 rate of reported tuberculosis disease was significantly higher for males than females ( $p < .001$ ) (**Table 16B**).

African Americans ( $p < .001$ ) and Hispanics ( $p < .001$ ) had significantly higher rates of tuberculosis disease than did whites.

Individuals aged 60+ years and the Northwest Health Region had the highest rates of tuberculosis disease for their respective socio-demographic. [NOTE: Only 0.8% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported tuberculosis disease significantly decreased among individuals aged 50-59 ( $p < .01$ ) (**Table 16B**).

Additionally, the rate of reported tuberculosis disease significantly decreased in the Eastern ( $p < .02$ ) Health Region in 2004 as compared to the 5-year mean rate (1999-2003).

**Table 16B—Tuberculosis Disease, Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	127	2.27	3.01
SEX <sup>1</sup>			
<i>Male</i>	85	3.12	3.92
<i>Female</i>	42	1.46	2.14
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	63	1.31	1.65
<i>Black</i>	50	7.63	10.41
<i>Hispanic</i>	13	1.96	8.26
AGE GROUP <sup>1</sup>			
<i>≤ 14 yrs</i>	6	0.59	0.98
<i>15-19 yrs</i>	4	0.69	0.66
<i>20-29 yrs</i>	20	2.73	2.35
<i>30-39 yrs</i>	15	1.83	3.34
<i>40-49 yrs</i>	24	2.86	2.88
<i>50-59 yrs</i>	9	1.44	3.93
<i>60+ yrs</i>	49	4.98	6.00
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	38	2.60	3.04
<i>Eastern</i>	46	2.15	3.35
<i>Central</i>	10	1.61	1.42
<i>Southeast</i>	9	2.01	3.39
<i>Southwest</i>	18	1.94	2.73

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section B - Communicable Disease Surveillance

### Tuberculosis Disease - Continued

**Comparison to National Data.** Since 1995, Missouri's annual rate of reported tuberculosis disease has generally decreased (**Figure 16B**) as has the national rate. From 1995-2003, Missouri's rate of reported tuberculosis disease was on average 46% lower than the national rate and is the lowest in the recorded history of this disease within Missouri.

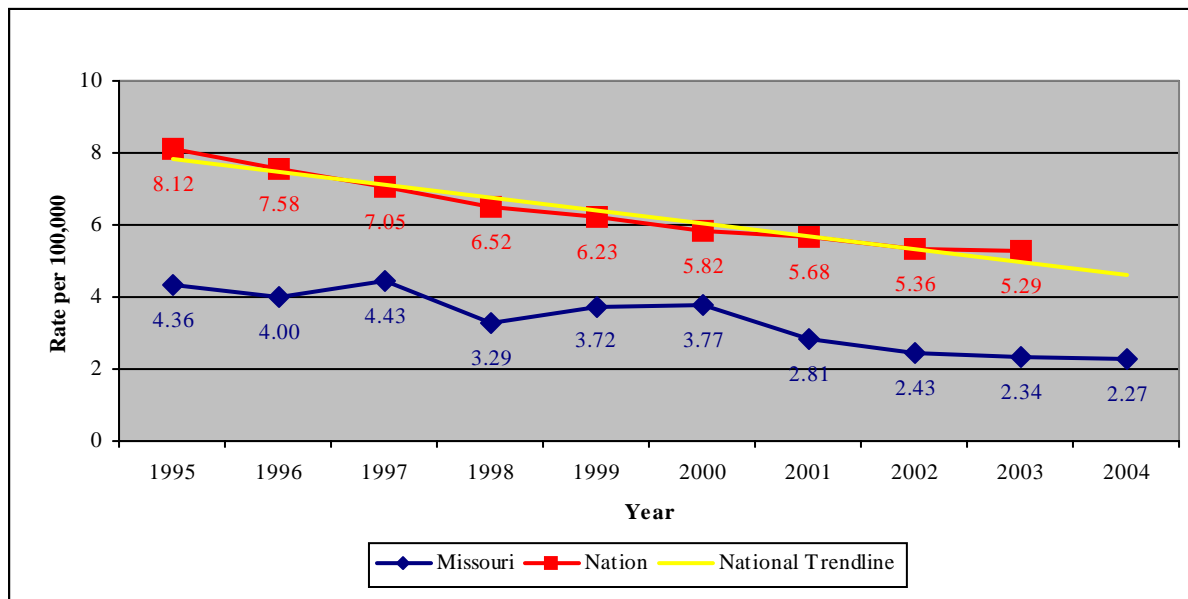


Figure 16B—Tuberculosis Disease Rates of Reported Cases, Missouri versus United States, 1995-2004

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM](#)  
[Health Region Defined](#)





## Section B - Communicable Disease Surveillance

### Tularemia



**Missouri Incidence.** In 2004, there were 28 reported cases of confirmed tularemia for a rate of 0.50 per 100,000 population (**Table 17B**). In comparison to combined 1999-2003 data, the rate of tularemia increased by 15%.

Considering only those cases with reported socio-demographics, the 2004 rate of reported tularemia was 40% higher for males than females (**Table 17B**). Rates for whites were slightly more than twice the rate for African Americans.

Individuals aged less than 13 and those greater than 59 years of age and the Central Health Region had the highest rates of tularemia for their respective socio-demographic. [NOTE: 35.7% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2003 data, the 2004 rate of reported tularemia showed no significant changes within sex, age group, or Health Region (**Table 17B**).

**Table 17B—Tularemia Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 1999-2003 <sup>2</sup>
<i>Total</i>	28	0.50	0.44
SEX <sup>1</sup>			
<i>Male</i>	17	0.62	0.53
<i>Female</i>	11	0.38	0.34
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	17	0.35	0.37
<i>Black</i>	1	0.15	0.06
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	8	0.79	0.87
<i>13-19 yrs</i>	0	0.00	0.21
<i>20-29 yrs</i>	1	0.14	0.25
<i>30-39 yrs</i>	3	0.37	0.22
<i>40-49 yrs</i>	5	0.60	0.40
<i>50-59 yrs</i>	3	0.48	0.29
<i>60+ yrs</i>	8	0.81	0.57
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	5	0.34	0.29
<i>Eastern</i>	7	0.33	0.07
<i>Central</i>	7	1.13	1.19
<i>Southeast</i>	1	0.22	0.53
<i>Southwest</i>	8	0.86	0.95

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section B - Communicable Disease Surveillance

### Tularemia - Continued

**Comparison to National Data.** Since 1995, Missouri's annual rate of reported tularemia has remained fairly stable (**Figure 17B**). From 2000-2003, when national data became available for comparison purposes, Missouri's rate of reported tularemia was on average nine times the national rate. Based on the national trend (**Figure 17B**) this disparity is likely to remain for 2004.

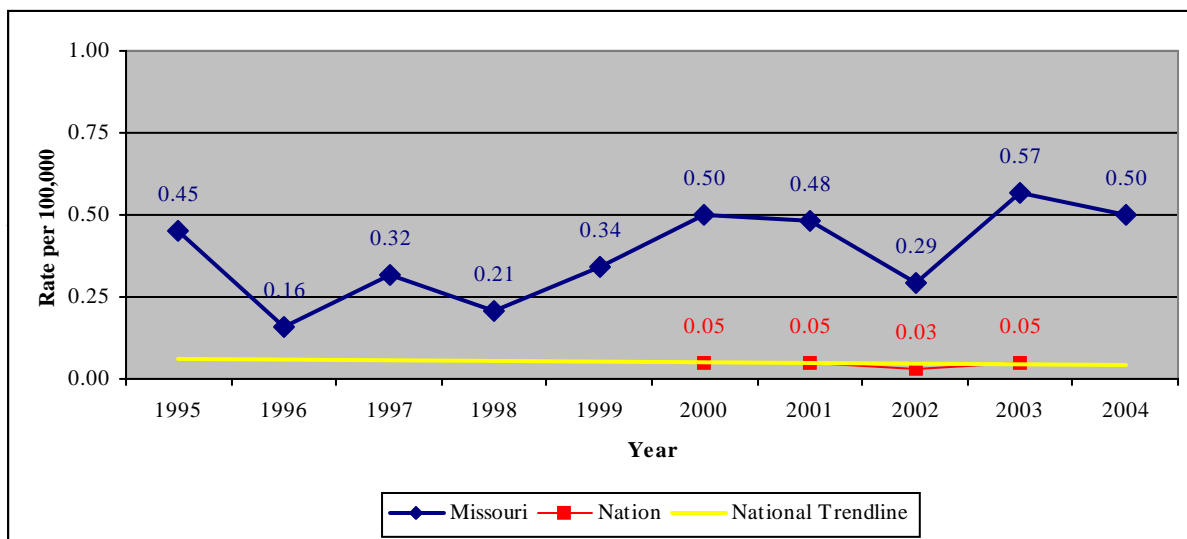


Figure 17B—Tularemia Rates of Reported Cases, Missouri versus United States, 1995-2004

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM](#)  
[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### West Nile Infection

#### West Nile Viral Encephalitis/Meningitis

**Missouri Incidence.** In 2004, there were 27 reported cases of confirmed or probable West Nile Viral Encephalitis/Meningitis for a rate of 0.48 per 100,000 population (**Table 18B**). In comparison to combined 2002-2003 data, the rate of West Nile Viral Encephalitis/Meningitis significantly decreased by 65% ( $p < .001$ ).

Considering only those cases with reported socio-demographics, the 2004 rate of reported West Nile Viral Encephalitis/Meningitis for males was twice that of females (**Table 18B**). African Americans ( $p < .02$ ) had significantly higher rates of West Nile Viral Encephalitis/Meningitis than did whites. Individuals aged 50-59 years and the Central Health Region had the highest rates of West Nile Viral Encephalitis/Meningitis for their respective socio-demographic. [NOTE: 25.9% of cases did not have a race/ethnicity designation.]

In comparison to combined 2002-2003 data, the 2004 rate of reported West Nile Viral Encephalitis/Meningitis significantly decreased among both males ( $p < .01$ ) and females ( $p < .001$ ), whites ( $p < .01$ ), and individuals aged 60+ years ( $p < .001$ ) (**Table 18B**). Additionally, the rate of reported West Nile Viral Encephalitis/Meningitis significantly decreased in the Eastern ( $p < .001$ ) Health Region.

[NOTE: Due to missing data, 2004 data were not compared to 2002-2003 for ethnicity.]



**Table 18B—West Nile Viral Encephalitis/Meningitis Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 2002-2003 <sup>2</sup>
<i>Total</i>	27	0.48	1.37
SEX <sup>1</sup>			
<i>Male</i>	18	0.66	1.51
<i>Female</i>	9	0.31	1.15
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	14	0.29	0.76
<i>Black</i>	6	0.92	1.83
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	1	0.10	0.25
<i>13-19 yrs</i>	1	0.17	0.09
<i>20-29 yrs</i>	1	0.14	0.82
<i>30-39 yrs</i>	3	0.37	1.10
<i>40-49 yrs</i>	4	0.48	1.37
<i>50-59 yrs</i>	7	1.12	1.84
<i>60+ yrs</i>	10	1.02	3.51
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	10	0.69	0.69
<i>Eastern</i>	11	0.51	2.71
<i>Central</i>	5	0.80	0.32
<i>Southeast</i>	0	0.00	0.45
<i>Southwest</i>	1	0.11	0.38

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

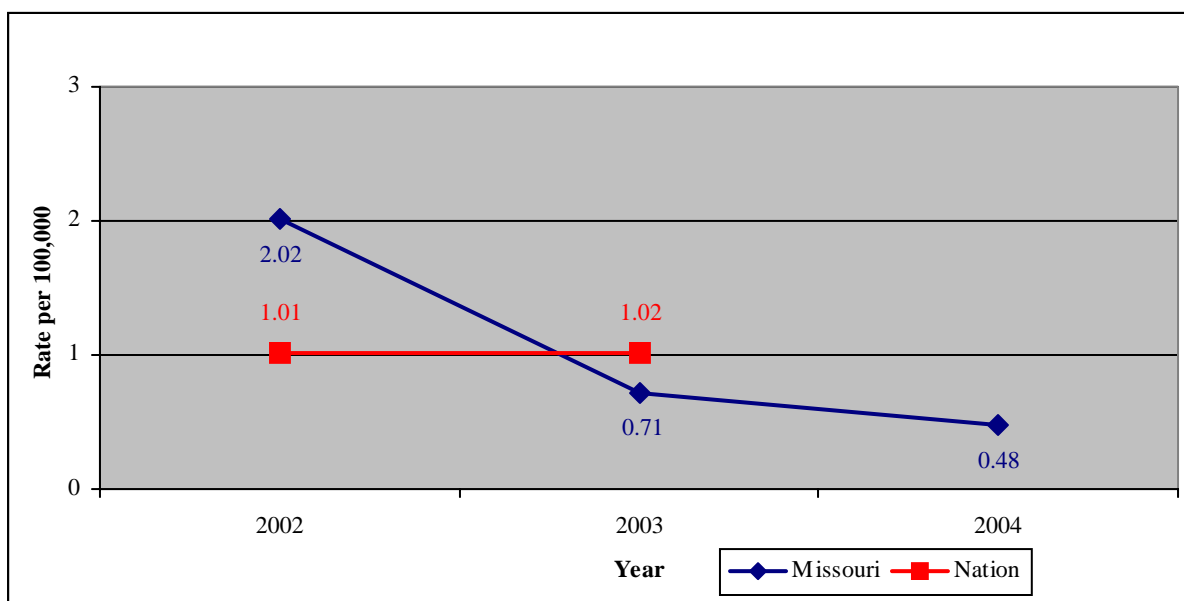


## Section B - Communicable Disease Surveillance

### West Nile Infection - Continued

#### West Nile Viral Encephalitis/Meningitis

**Comparison to National Data.** Since 2002, Missouri's annual rate of reported West Nile Viral Encephalitis/Meningitis has generally decreased (**Figure 18B**). In 2002, Missouri's rate of West Nile Viral Encephalitis/Meningitis was twice the national rate; however, within the next year it had dropped to 30% below the national rate. If the national rate continues its stable trend, Missouri's rate for 2004 is on pace to be approximately 50% lower than the national rate.



**Figure 18B—West Nile Viral Encephalitis/Meningitis Rates of Reported Cases, Missouri versus United States, 2002-2004**

\*West Nile Viral Encephalitis/Meningitis was added to Missouri's reporting rule (19 CSR 20-20.020) in 2002

#### Additional Website Resources

[CDC Health Topics](#)  
[CDIRM WN E/M](#)  
[CDIRM WN Fever](#)  
[Health Region Defined](#)



## Section B - Communicable Disease Surveillance

### West Nile Infection - Continued

#### West Nile Fever

**Missouri Incidence.** In 2004, there were nine reported cases of confirmed or probable West Nile Fever for a rate of 0.16 per 100,000 population (**Table 19B**). In comparison to combined 2002-2003 data, the rate of West Nile Fever significantly decreased by 76% ( $p < .001$ ).

Considering only those cases with reported socio-demographics, the 2004 rate of reported West Nile Fever was similar for males and females (**Table 19B**). There is also no significant difference in rates between African Americans and whites. Individuals aged 40-49 years and the Eastern Health Region had the highest rates of West Nile Fever for their respective socio-demographic. [NOTE: 22.2% of cases did not have a race/ethnicity designation.]

In comparison to combined 2002-2003 data, the 2004 rate of reported West Nile Fever significantly decreased among both males ( $p < .01$ ) and females ( $p < .01$ ), whites ( $p < .02$ ), and individuals aged 30-39 ( $p < .05$ ), 50-59 ( $p < .02$ ), and 60+ years ( $p < .01$ ) (**Table 19B**).

Additionally, the rate of reported West Nile Fever significantly decreased in the Northwest ( $p < .05$ ), Eastern ( $p < .01$ ), and Central ( $p < .05$ ) Health Regions. [NOTE: Due to missing data, 2004 data were not compared to 2002-2003 for ethnicity.]

Note: Comparisons of Missouri incidence for West Nile Fever versus the nation could not be accomplished as national data is unavailable.

**Table 19B—West Nile Fever Comparative Statistics, by Socio-demographic Category<sup>1</sup>, Missouri**

	Case Count: 2004	Rate: 2004 <sup>2</sup>	Mean Rate: 2002-2003 <sup>2</sup>
<i>Total</i>	9	0.16	0.67
SEX <sup>1</sup>			
<i>Male</i>	5	0.18	0.72
<i>Female</i>	4	0.14	0.57
RACE/ETHNICITY <sup>1,3</sup>			
<i>White</i>	7	0.15	0.40
<i>Black</i>	0	0.00	0.46
<i>Hispanic</i>	n/a	n/a	n/a
AGE GROUP <sup>1</sup>			
<i>≤ 12 yrs</i>	0	0.00	0.10
<i>13-19 yrs</i>	2	0.35	0.09
<i>20-29 yrs</i>	0	0.00	0.48
<i>30-39 yrs</i>	0	0.00	0.61
<i>40-49 yrs</i>	5	0.60	1.07
<i>50-59 yrs</i>	1	0.16	1.28
<i>60+ yrs</i>	1	0.10	1.07
HEALTH REGION <sup>1,4</sup>			
<i>Northwest</i>	2	0.14	0.62
<i>Eastern</i>	5	0.23	0.84
<i>Central</i>	1	0.16	1.21
<i>Southeast</i>	0	0.00	0.45
<i>Southwest</i>	1	0.11	0.11

<sup>1</sup> Socio-demographic data are missing for some cases.

<sup>2</sup> All rates calculated using 2000 U.S. Census Bureau data per 100,000 population.

<sup>3</sup> Race/ethnicity categories are not mutually exclusive.

<sup>4</sup> Regional 5-year mean rates have been calculated using current boundaries.

## Section C - Environmental Surveillance

Environmental and occupational diseases and conditions have been reportable in Missouri since legislation mandating such reporting was enacted in 1993. The reporting of environmental and occupational diseases is a growing component of the overall surveillance effort of the Office of Surveillance (OoS). The OoS is responsible for conducting surveillance, analysis, and generating reports on 12 different categories of environmental and occupationally induced diseases and conditions. Many cases of environmental and occupational diseases and conditions are not reported as thoroughly as is needed which hinders efforts to accurately track, develop reports, and make predictions on environmental conditions. The major cause of under reporting appears to be the lack of knowledge by mandated reporters of these 12 categories of environmental and occupationally induced diseases and conditions: Hyperthermia, Hypothermia, Blood lead levels in any person  $\leq 72$  months of age, Blood lead levels in any person  $\geq 72$  months of age, Arsenic poisoning, Carbon monoxide poisoning, Chemical poisoning, Heavy metal poisoning, Occupational lung diseases, Pesticide poisoning, Respiratory diseases triggered by environmental contaminants including environmentally or occupationally induced asthma and bronchitis. See Figure 1C.

There is adequate information and data in the categories of Adult Blood Lead levels, Childhood Blood Lead levels, Hazardous Substances Emergency Events, Carbon Monoxide Poisoning, Mercury Poisoning, Hyperthermia and Hypothermia to accurately analyze and generate reports. Reports on these diseases and conditions are provided on the subsequent pages.

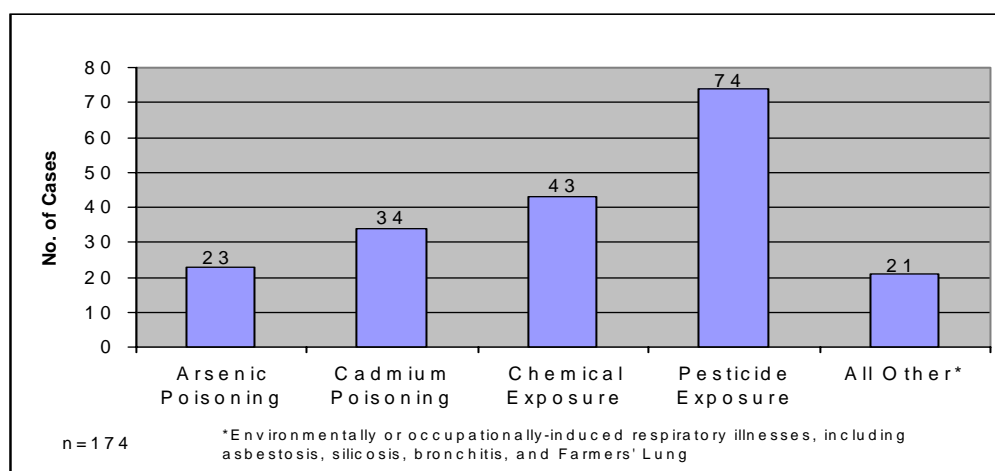


Figure 1C—Cases of Selected Environmental Conditions, Missouri 2001-2004

## Section C - Environmental Surveillance

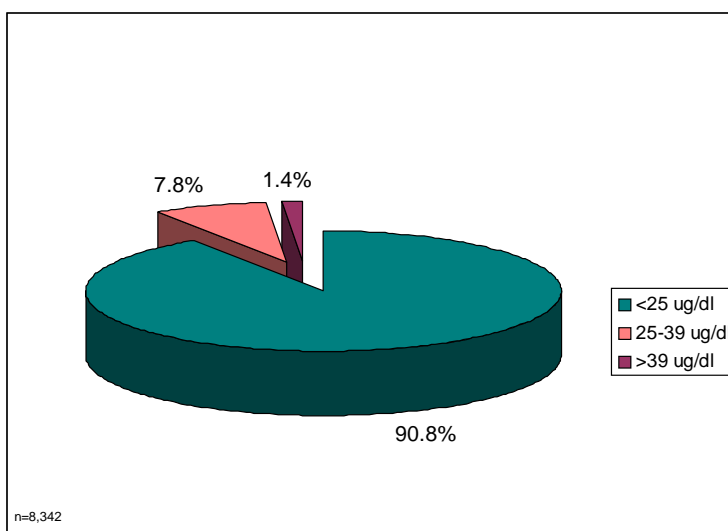
### Missouri Adult Blood Lead Epidemiology and Surveillance Program

The Centers for Disease Control and Prevention (CDC), National Institute of Occupational Safety and Health (NIOSH) has funded states to operate the Adult Blood Lead Epidemiology and Surveillance (ABLES) program since 1987. The goal of this program is the elimination of all cases of workplace-induced blood lead elevations  $\geq 25$   $\mu\text{g/dL}$  (micrograms of lead per deciliter of blood) in adults by the year 2010. In 2004, 37 states were funded to collect and analyze data on cases of elevated blood lead levels in individuals age 16 years and older. The majority of lead elevations in this population are believed to be due to exposures in the workplace. Non-identifying data are reported to NIOSH by the MO ABLES program for national surveillance purposes.

All blood lead testing of Missouri residents is reportable to the Missouri Department of Health and Senior Services (DHSS) under the Missouri Code of State Regulations 19 CSR 20-20.20 and 19 CSR 20-20.80, regardless of age of the patient or blood lead level. DHSS's Office of Surveillance administers the Missouri ABLES (MO ABLES) program, which was first funded by NIOSH in Fall 2001. This report summarizes blood lead testing and elevated lead levels in Missouri residents age 16 years and older for calendar year 2004.

There were 14,287 blood specimens drawn, analyzed, and reported to the MO ABLES program for Missouri residents age 16 years and older for the period January 1 through December 31, 2004. Blood specimens drawn but not analyzed are excluded. The range of reported blood lead levels was from zero (or non-detectable) to a high of 148  $\mu\text{g/dL}$ . The majority of specimens analyzed, 11,558 (80.9%) were  $< 25$   $\mu\text{g/dL}$ .

Analysis of the MO ABLES 2004 data revealed 2,075 adults were tested more than once, for a total of 8,342 unduplicated individuals being tested in 2004. Of these, 7,577 (90.8%) had lead levels  $< 25$   $\mu\text{g/dL}$ . There were 647 (7.8%) reported with lead levels between 25  $\mu\text{g/dL}$  and 39  $\mu\text{g/dL}$ , and 118 (1.4%) whose highest level was 40  $\mu\text{g/dL}$  or above (**Figure 2C**). For statistical purposes, blood lead level determination for Missourians tested more than once during the timeframe is based upon their highest reported blood lead level.



**Figure 2C—Missouri Adults by Blood Lead Level, 2004**



## Section C - Environmental Surveillance

### Missouri Adult Blood Lead Epidemiology and Surveillance Program (continued)

In total during 2004, 765 (9.2%) of all individuals tested had at least one blood lead test at or above 25 µg/dL, the lead level of concern for non-pregnant adults. The highest level acceptable for workers by U.S. Occupational Safety and Health Administration (OSHA) standards is 40 µg/dL.

The MO ABLES program data are primarily collected through reporting by laboratories analyzing blood lead specimens. Information reported is to include patient date of birth or age, home address, gender, race, ethnicity, date of blood lead test, and laboratory results. However, laboratory data often do not include all information needed by the MO ABLES program. Missing information on individuals with blood lead levels  $\geq 25$  µg/dL is sought by contacting medical providers and employers; therefore, data on non-elevated adults are more likely to be incomplete in the MO ABLES database.

The following data analyses were performed on the data set consisting of only the 765 individuals with at least one blood lead level  $\geq 25$  µg/dL during calendar year 2004.

Of the 765 adults with elevated blood lead levels tested in 2004, the majority (757, 99.0%) were between 18 and 64 years of age at the time their blood specimen was drawn. During this time frame, there was also 1 (0.1%) elevation in the 16 to 17 year-old age range, and 7 (0.9%) adults 65 years or older and with an elevated blood lead level. (Figure 3C).

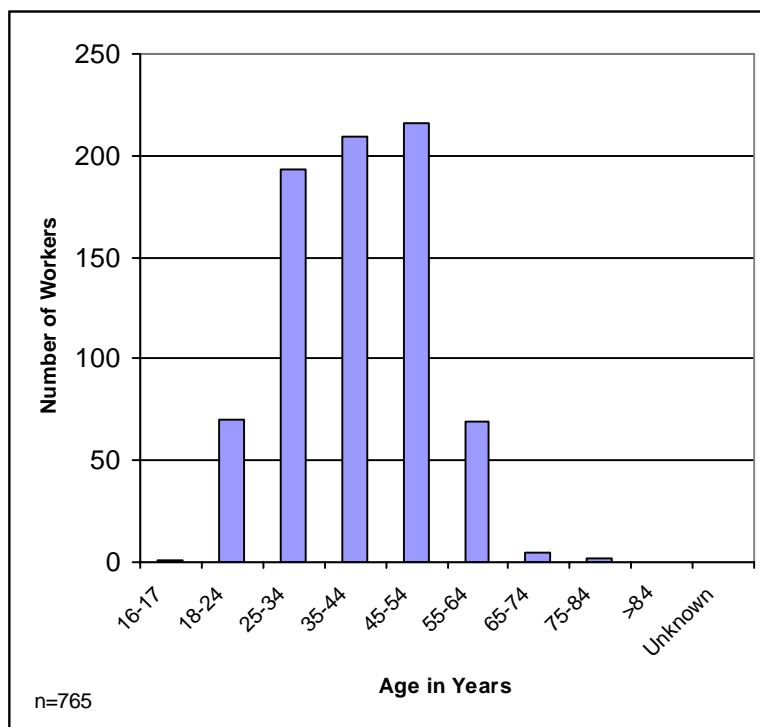
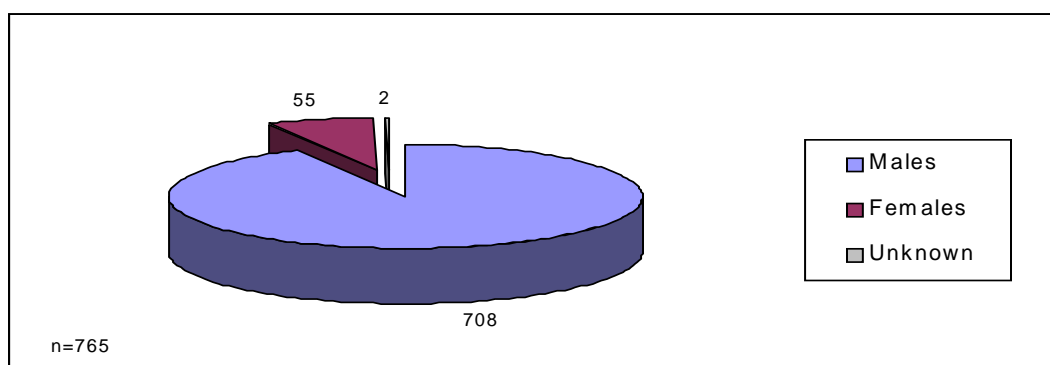


Figure 3C—Adults with Elevated Lead Levels by Age, 2004

## Section C - Environmental Surveillance

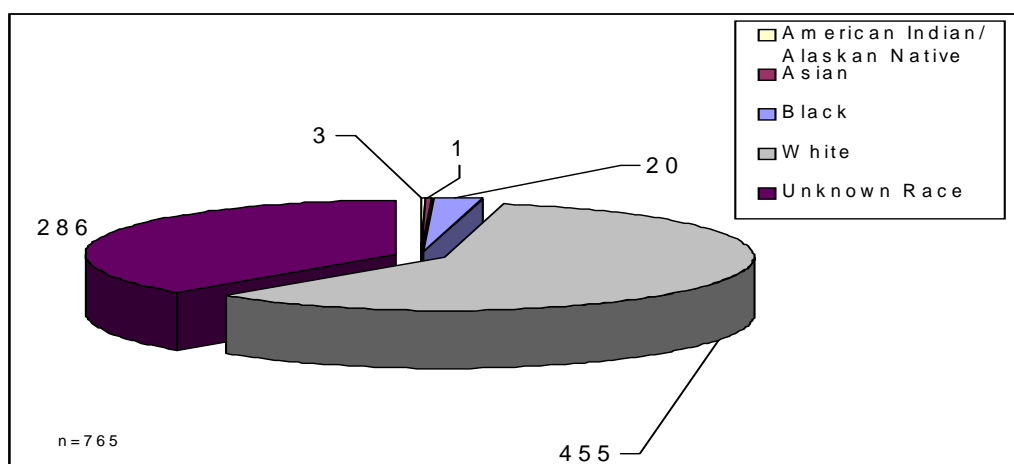
### Missouri Adult Blood Lead Epidemiology and Surveillance Program (continued)

**Figure 4C** illustrates that 708 (92.5%) adults with elevated lead levels were male, females comprised 55 (7.2%), and 2 (0.3%) were unknown sex.



**Figure 4C—Adults with Elevated Lead Levels by Sex, 2004**

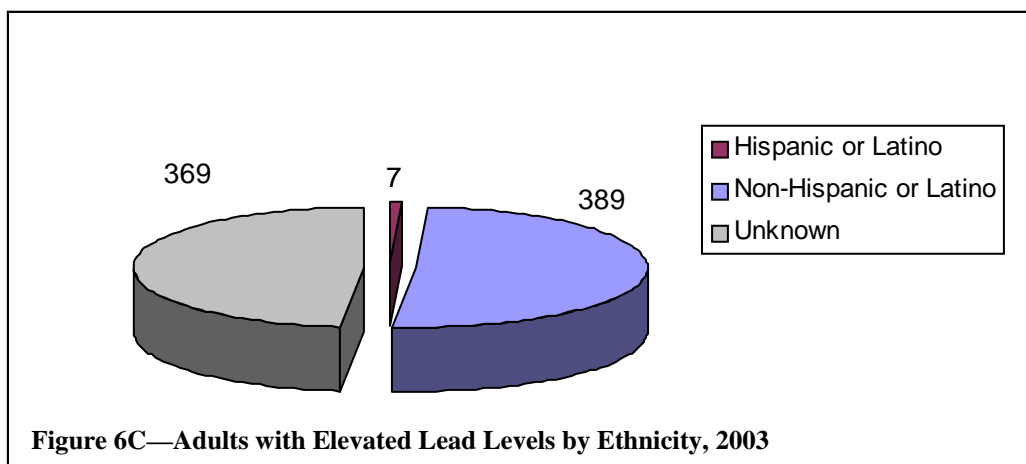
Race and ethnicity information is sought for all adults with elevated lead levels. MO ABLES staff find that many medical providers and employers do not have this information available about their patients and workers. For the 479 (62.6%) individuals with a reported race, 455 (95.0%) were White, 20 (4.2%) were Black, 3 (0.6%) were Native American or Alaskan Native, and 1 (0.2%) was reported as Asian or Pacific Islander. Of 396 (51.8%) elevated adults with a reported ethnicity, 389 (98.2%) were Non-Hispanic and 7 (1.8%) were Hispanic. However, as indicated in **Figures 5C and 6C**, race and ethnicity are not known for many adults with elevated lead levels.



**Figure 5C—Adults with Elevated Lead Levels by Race, 2004**

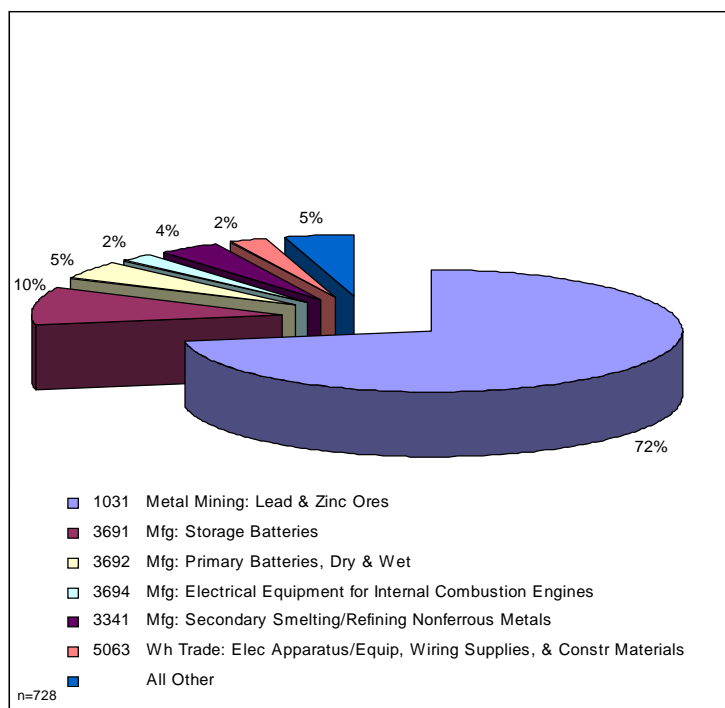
## Section C - Environmental Surveillance

### Missouri Adult Blood Lead Epidemiology and Surveillance Program (continued)



Of the 765 individual records with blood lead levels  $\geq 25$   $\mu\text{g/dL}$  drawn in 2004, 728 (95.5%) have a known employer and Standardized Industry Code (SIC). Six industries represented 694 (95.5%) of the workers whose records had a SIC code. Metal mining (SIC 1031), which is the industry employing 526 (72.3%) lead-elevated workers in 2004, is conducted in Dent, Iron and Jefferson counties. The industries with the largest numbers of lead-elevated employees are shown in **Figure 7C** and **Table 1C**.

A worker's place of employment is assumed to be their source of exposure unless other source information, such as an exposure by hobby, is received.





## Section C - Environmental Surveillance

### Missouri Adult Blood Lead Epidemiology and Surveillance Program (continued)

Table 1C—Lead-Elevated Workers by Industry, 2004

<i>SIC Division</i>	<i>Standard Industry Code (SIC)</i>	<i>SIC Activity</i>	<i># Workers Elevated <math>\geq</math> 25 ug/dl</i>
Metal Mining	1031	Lead & Zinc Ores	526
Manufacturing	3691	Storage Batteries	72
Manufacturing	3692	Primary Batteries, Dry & Wet	35
Manufacturing	3341	Secondary Smelting & Refining of Nonferrous Metals	27
Wholesale Trade	5063	Electrical Apparatus & Equipment, Wiring Supplies, & Construction Materials	18
Manufacturing	3694	Electrical Equipment for Internal Combustion Engines	17
Various	Various	All other Standard Industry Codes combined	33
Total			728

Lead battery manufacturing, mining, smelting, and other related industries are an important part of Missouri's economic base. Some of the world's largest known lead deposits are located in Missouri, and mining has been ongoing since the 1700s. While lead is a great economic resource, lead in the human body is a health hazard. Missouri's largest lead industries provide community education and services, and they test their employees according to OSHA requirements. These companies also cooperate in providing demographic information to aid the MO ABLES program in data collection.

There were 14 records for lead-elevated adults without an identifiable employer or SIC code, but for whom an occupation or other source was known. These sources included painting (4), repairing automobiles/radiators (2), non-specific construction/renovation (3), bullets lodged in body (2), ceramics hobby (1), factory work (1), and residing in a home with lead-based paint (1). Employment or source information on 23 individuals was not available, including three



## Section C - Environmental Surveillance

### Missouri Adult Blood Lead Epidemiology and Surveillance Program (continued)

persons for whom their physician could not determine the cause of the lead elevation, and one suspected false positive or misreported lead level.

The MO ABLES database includes 727 (95.0%) records with a known county of employment for the 765 individuals with a blood lead elevation in calendar year 2004. Workers who are employed out of state are included in the MO ABLES data if they are known to reside in Missouri. Of the 727 lead-elevated workers with a known address of employment, 51 (6.7%) individuals were working in another state. There were 17 Missouri counties (including St. Louis City) where workers with a blood lead elevation  $\geq 25$  mg/dl were employed in 2004. There were 42 (5.5%) Missouri residents with elevated blood lead levels who were employed in Kansas, 4 (0.5%) 3 (0.4%) in Iowa, and 2 (0.3%) in Wisconsin ([Map 1](#)).

As shown by [Map 2](#), many workers commute across county boundaries to reach their places of employment. Analysis of this trend is impaired because reported information often does not include a worker's home address to compare with employment address data. Of the 761 elevated workers for 2004 with a known county of employment, 745 (97.9%) included a county of residence. While workers with known lead elevations live in 57 of Missouri's 115 counties, their places of employment are concentrated in only 21 counties, 4 of which are out-of-state. Of the 765 workers with elevated blood lead levels in 2004, 662 (86.5%) are both employed and live in the state of Missouri.



## Section C - Environmental Surveillance

### Missouri Childhood Lead

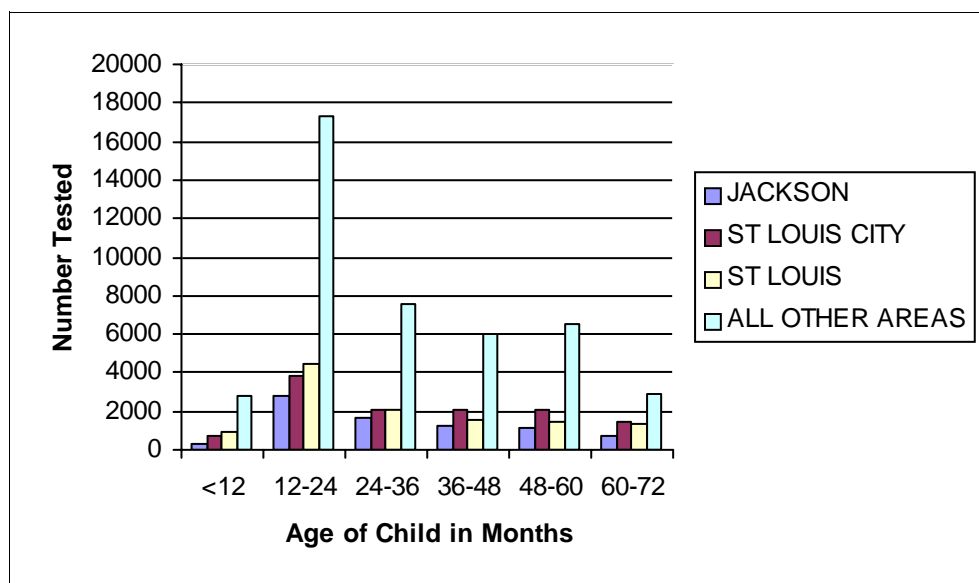
Childhood lead poisoning is one of the most common and preventable environmental health problems today. An estimated one million children in the United States have elevated blood lead levels of at least 10 µg/dL (micrograms lead per deciliter blood) which is the level of concern established by the CDC (Centers for Disease Control and Prevention). Lead affects almost every organ and system in the body, but most notably damaging the brain, central nervous system, kidneys, and immune system. Lead in the human body is most harmful to young children under the age of six. In 1993, the state of Missouri began electronically collecting childhood blood lead testing and demographic information. In 2000, all blood lead tests regardless of age or lead level were required to be reported to DHSS. However, data quality issues exist. For example, 42% of the blood test reports do not include the race of the patient. The current CDC recommendation is to target high-risk areas within the state for childhood lead poisoning prevention testing and follow-up services. Missouri Senate Bill 266, passed in 2001, required DHSS to promulgate rules and regulations to establish a statewide screening plan. The rules and regulations define criteria for establishing geographic areas in the state considered to be at higher risk for lead poisoning and outline blood lead testing requirements, protocols, and lead testing follow-up and treatment procedures.

The primary source for lead exposure for children in Missouri is from deteriorated lead-based paint that was banned for residential use in 1978. The highest risk of lead exposure for children is found in homes built before 1950. Twenty-four percent (24%) of all housing in Missouri was built before 1950, and 60 counties in Missouri have greater than 24% pre-1950 housing. In the past five years of blood lead data analysis, the percentage of children poisoned (blood lead levels  $\geq 10$  µg/dL) has decreased from 10% (5,458) to 4% (3,087), while the number of children tested has increased 52% from 54,966 in 2000 to 75,110 in 2004. The percentage of the population under six years of age tested increased from 12% in 2000 to 17% in 2004. The geographic area with the highest risk for childhood lead poisoning continues to be St. Louis City, which comprises 6% of the population of children under six in the state. However, they report 51% of the lead-poisoned children in Missouri, and 70% of their housing was built prior to 1950. Additional details on childhood blood lead testing data by county and a map with criteria establishing geographic areas requiring universal testing versus targeted testing may be viewed on the Missouri Childhood Lead Website located at: <http://www.dhss.mo.gov/ChildhoodLead/>. Geographic areas of the state are designated for Universal Testing, which requires annual testing for children less than six years of age or Targeted Testing, which requires Medicaid children to be tested at 12 and 24 months of age. All children less than six living in a targeted testing area are required to answer an annual screening questionnaire to determine the testing requirement.

## Section C - Environmental Surveillance

### Missouri Childhood Lead (continued)

There has been a significant increase in the number of Missouri children tested for lead poisoning. Factors contributing to this increase include: 1) the development of the statewide testing plan designating areas of high risk, 2) the requirement from Department of Social Services/Division of Medical Services that all Medicaid-eligible children be tested at 12 and 24 months of age, and 3) inclusion of blood lead testing as a performance measure for selected counties in their Department of Health and Senior Services (DHSS), Maternal Child and Family Health contracts. The cohort analysis chart (**Figure 8C**) provides a more detailed examination of testing patterns by the age of the child in each geographic region of Missouri. While testing is increasing in many areas of the state—most notably in the non-metro areas—there continues to be a significant number of EBL (elevated blood lead) children statewide (**Figures 9C and 10C**). Continued outreach and education on testing criteria should increase testing and effective case management of EBL children, environmental assessment and remediation of properties with identified lead hazards throughout the state.



**Figure 8C—Number of Children Tested for Lead Poisoning by Age and Area of Residence, 2004**



## Section C - Environmental Surveillance

### Missouri Childhood Lead (continued)

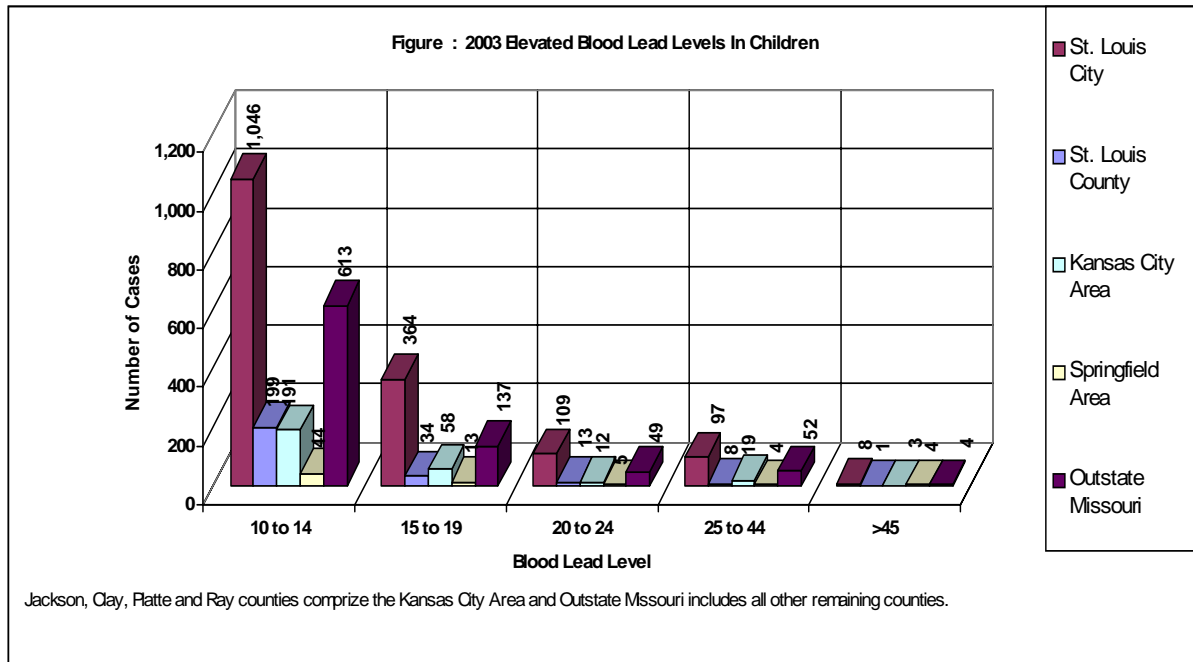
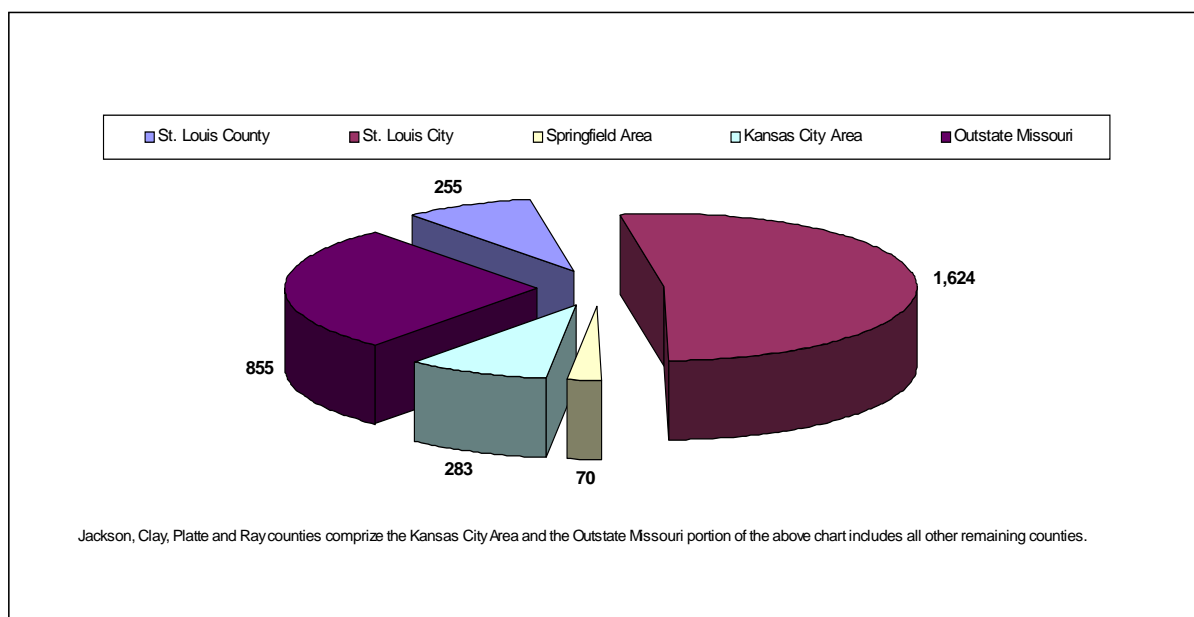


Figure 9C—Ranges of Elevated Blood Lead Levels in Children, 2004

## Section C - Environmental Surveillance

### Missouri Childhood Lead (continued)



**Figure 10C—Number of Children with Elevated Blood Lead Levels by Area of Residence, 2004**

#### Additional Information

Centers for Disease Control Lead Website  
<http://www.cdc.gov/nceh/lead/lead.htm>

Alliance for Healthy Homes  
<http://www.aecclp.org/>

Coalition to End Childhood Lead Poisoning  
<http://www.lead-safe.org/index.htm>

Department of Health and Senior Services  
 Childhood Lead Poisoning Prevention  
<http://www.dhss.mo.gov/ChildhoodLead/>

## Section C - Environmental Surveillance

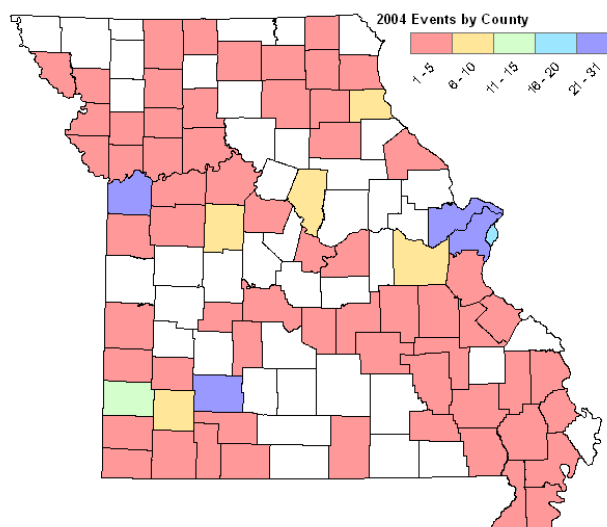
### Hazardous Substances Emergency Events Surveillance (HSEES)

A total of 300\* events meeting the Hazardous Substances Emergency Events Surveillance (HSEES) case definition were reported during calendar year 2004. Events occurred in 73 counties including the City of St. Louis (**Figure 11C**). Of the 300 events, one was a threatened release and the remaining were actual releases. Of all reported events, 148 (49%) occurred at fixed facilities and 152 (51%) were transportation-related. The most common fixed-facility events in which only one area was involved were indoor, non-industrial, living (residence) areas (35, 24%); indoor, non-industrial, non-living areas (31, 21%) and storage areas above ground (26, 18%). Two (1%) fixed-facility events involved more than one affected area. The most common transportation events (144, 95%) occurred during ground transport (e.g., tanker truck, non-tanker truck, van, or automobile) and eight (5%) involved transport by rail.

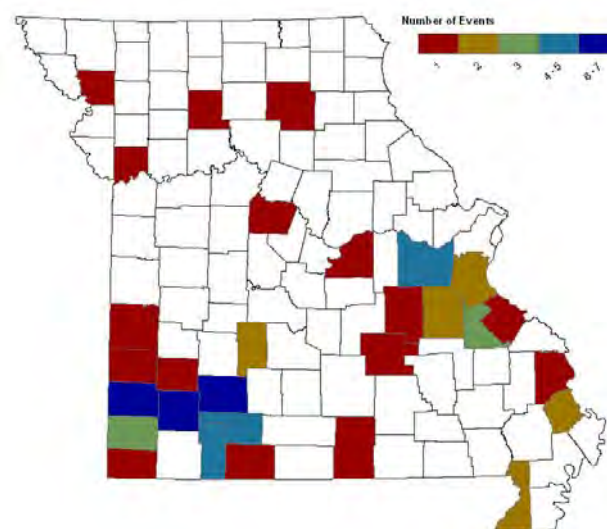
Methamphetamine-related activities contributed to the total number of events reported with 64 (21%) events resulting from methamphetamine production (**Figure 12C**).

#### CONTRIBUTING FACTORS

Data regarding primary and secondary factors contributing to events were collected on all 300 events. Human error was the primary factor in 192 (64%) of the events; of which 29 (15%) were due to responders not having the appropriate Personal Protective Equipment (PPE) when entering a methamphetamine lab.



**Figure 11C—Geographic distribution of events by county, Hazardous Substances Emergency Events Surveillance, Missouri, 2004**



**Figure 12C—Distribution of methamphetamine events by county, Hazardous Substances Emergency Events Surveillance, Missouri, 2004.**

\*All data is preliminary, subject to change



## Section C - Environmental Surveillance

### Hazardous Substances Emergency Events Surveillance (continued)

Equipment failure was the primary factor in 51 (17%) events. The primary factor was not known for 12 events (4%). Intentional or illegal act was the primary factor for 40 (13%) events.

#### CHEMICALS RELEASED

During 2004, there were a total of 404 substances involved in the 300 events. Of those, there were 403 substances that were actually released during 299 HSEES events. Fixed-facility events involved the release of 229 substances, and transportation-related events involved the release of 174 substances. The 10 substances most frequently released in Missouri for calendar year 2004 were Ammonia, Hydrochloric Acid, Acetone, Sodium Hydroxide, Sulfuric Acid, Proteat, Mercury, Ethyl Ether, Methamphetamine Chemicals Not Otherwise Specified (NOS) and Phosphorus (**Table 2C**).

Of the 16 categories into which HSEES substances were grouped, the categories of substances most commonly released in fixed-facility events were other inorganic substances (54, 24%), acids (38, 17%) and volatile organic compounds (37, 16%). In transportation-related events the most frequently released chemicals were categorized as volatile organic compounds (35, 20%), other inorganic substances (25, 14%) and acids (25, 14%).

The substances most frequently released may not necessarily be the most likely to result in victims (**Table 3C**). For example, ammonia was released during 43 events; however, only 19 of these events (44%) resulted in adverse health effects. Conversely, bases were released in only 29 events, and 18 of these events (62%) resulted in adverse health effects, indicating its greater potential for immediate harm.

**Table 2C—10 most frequently released substances, Hazardous Substances Emergency Events Surveillance, Missouri, 2004.**

Number	Standardized Substance Name	Frequency
1.	Ammonia	43
2.	Hydrochloric Acid	26
3.	Mercury	23
4.	Acetone	20
5.	Sulfuric Acid	19
6.	Phosphorus	19
7.	Sodium Hydroxide	15
8.	Methamphetamine Chemicals NOS*	13
9.	Ethyl Ether	11
10.	Proteat	10
	Total	199
	*Not Otherwise Specified	



## Section C - Environmental Surveillance

### Hazardous Substances Emergency Events Surveillance (continued)

**Table 3C—Number of substances released in all events and events with victims, by substance category, Hazardous Substances Emergency Events Surveillance, Missouri, 2004.**

Substance category	Total Releases		Releases with Victims		
	No.	Percentage of total releases	No.	Percentage of all releases with victims	Percentage of releases in substance category
Acids	63	16%	39	20%	62%
Ammonia	43	11%	19	10%	44%
Bases	29	7%	18	9%	62%
Chlorine	9	2%	1	1%	11%
Other inorganic substances	79	20%	44	22%	56%
Paints & dyes	9	2%	0	0%	0%
Pesticides	15	4%	2	1%	13%
Polychlorinated biphenyls	2	0.50%	0	0%	0%
Volatile organic compounds	72	18%	43	22%	60%
Other, not otherwise specified	30	7%	22	11%	73%
Mixture	20	5%	6	3%	30%
Formulations	1	0.30%	0	0%	0%
Hetero-Organics	1	0.30%	0	0%	0%
Hydrocarbons	2	0.50%	1	1%	50%
Oxy-Organics	16	4%	2	1%	13%
Polymers	12	3%	1	1%	8%
Total *	403	**100.6%	198	**102%	-

\*Total exceeds number of events because events in which more than one substance was released were counted more than once.

\*\*Percentage does not equal 100% due to rounding.

## Section C - Environmental Surveillance

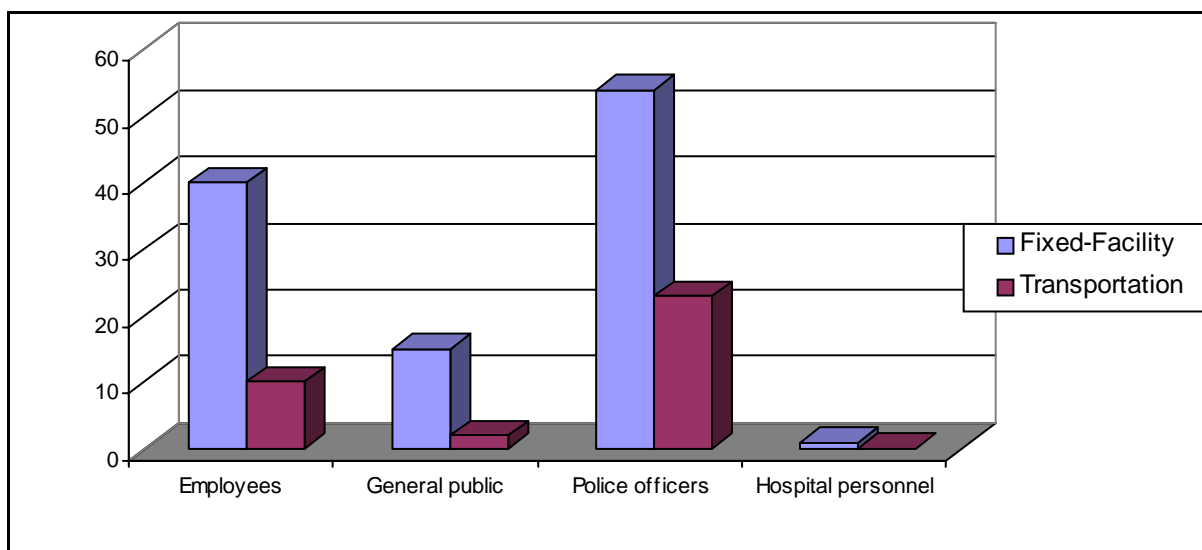
### Hazardous Substances Emergency Events Surveillance (continued)

#### VICTIMS

A total of 145 victims were involved in 95 events (32% of all events). Of the 95 events, 70 events occurred in a fixed facility. Of the events with victims, 73 (50%) involved only one victim and 12 (8%) involved two victims. Three events (2%) involved five or more victims. Of the total number of victims, 110 (76%) were injured during fixed-facility events. For transportation events, 35 people (24%) sustained adverse health outcomes.

The population groups most often adversely affected were police officers (77, 53%) and employees (50, 34%). However, the general public (17, 12%) and hospital personnel (1, 0.7%) were also affected. There were 54 first responder victims in fixed-facility events and 23 first responder victims in transportation-related events. Of the 77 first responder victims, (69, 90%) were police officers injured during methamphetamine-related events (**Figure 13C**).

The 145 victims sustained a total of 207 adverse health effects. The most commonly reported adverse health effects were respiratory irritation (67, 32%), headache (62, 32%) and dizziness or other central nervous system symptoms (17, 8%). Other reported adverse health effects (61, 29%) were burns (chemical-related, not chemical-related or both), symptoms from carbon monoxide, chemical poisoning, eye irritation, gastrointestinal problems, heat stress, high blood pressure, skin irritation, trauma (chemical-related, not chemical-related or both).



**Figure 13C—Distribution of victims by population group and type of event, Hazardous Substances Emergency Events Surveillance, Missouri, 2004**



## Section C - Environmental Surveillance

### Hazardous Substances Emergency Events Surveillance (continued)

Of the 143 victims for who the status of disposition was known, a total of 60 victims (42%) were treated at a hospital but were not admitted; 8 (6%) were treated at a hospital and admitted. Injuries for 70 victims (49%) were reported by an official within 24 hours of the event. The majority of these injuries were self-reported by law enforcement officers responding to and/or collecting evidence from clandestine methamphetamine labs.

Of the two deaths reported in the HSEES system in 2004, both were related to methamphetamine production. In one incident, a man was killed and a woman was critically injured when a tank of anhydrous ammonia exploded in the rear of the vehicle during transportation. The remaining fatality involved a house fire, due to a methamphetamine lab, that killed a man in the house.

#### EVACUATIONS

Evacuations were ordered in 21 events (7%). The number of persons evacuated was known for 16 of the 21 events and the median number of persons evacuated was 9 (range: 1 - 600). The length of evacuation was known for 13 of the 21 events and the median length of evacuation was 3.3 hours (range: 1 - 12 hrs).

Evacuations were ordered in 2 of the 21 events as a result from methamphetamine-related activity. The number of people evacuated was known in one of the two events; in which 4 people were evacuated in this event. One of the events involving an evacuation involved an active residential methamphetamine lab and the other was caused by the theft of anhydrous ammonia.

For additional reports, data analyses and information on the Missouri HSEES program please view our web site at [www.dhss.mo.gov/hsees](http://www.dhss.mo.gov/hsees).



## Section C - Environmental Surveillance

### Carbon Monoxide Poisoning

Carbon monoxide is an invisible, odorless, tasteless, and highly poisonous gas. The burning of fossil fuels such as gasoline, natural gas, kerosene, charcoal, or wood produce the gas. Inside a home, carbon monoxide can be produced from a natural gas-fueled furnace, water heater, clothes dryer, space heater, or range; or fireplace, wood stove, or kerosene heater. The early symptoms of carbon monoxide exposure include headaches, dizziness, weakness, sleepiness, nausea, and vomiting; more extreme consequences include disorientation, coma, convulsions and death. Carbon monoxide poisoning is defined as a carboxyhemoglobin level of  $\geq 15\%$ , although lower levels can cause symptoms and illness. People suspected of carbon monoxide poisoning should seek immediate medical attention.

Centers for Disease Control and Prevention (CDC) statistics show that each year more than 500 Americans die from unintentional carbon monoxide poisoning, and more than 2,000 commit suicide by intentionally poisoning themselves. In Missouri, there were total of 202 reported poisoning\* cases in 2001-2004, with 126 (62%) of these resulting in death (Figure 14C).

\* Case definition: carboxyhemoglobin  $\geq 15\%$  or death certificate states death due to carbon monoxide poisoning

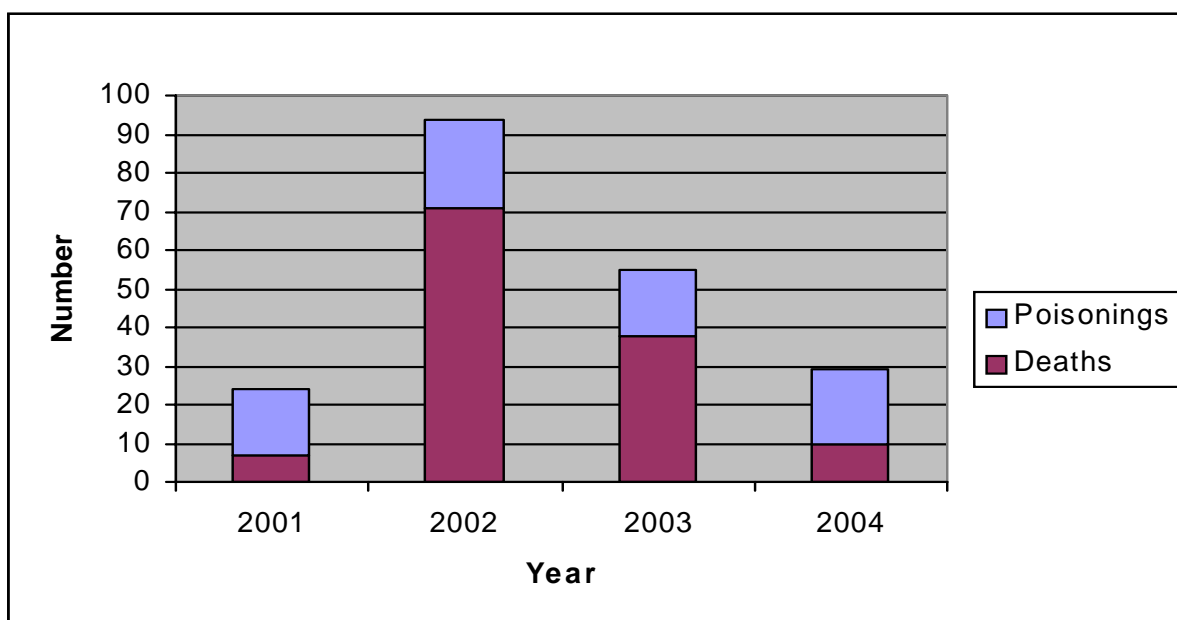


Figure 14C—Carbon Monoxide Poisonings, Missouri 2001-2004

## Section C - Environmental Surveillance

### Carbon Monoxide Poisoning (continued)

Of the total 126 carbon monoxide deaths, in Missouri from 2001-2004, 69 (55%) were suicides. There were 53 (42%) accidental deaths, 1 (1%) homicide, and 3 (2%) deaths where the manner was unknown (**Figure 15C**).

In Missouri, health care providers and laboratories are mandated to report cases of carbon monoxide poisoning to their local or state public health department.

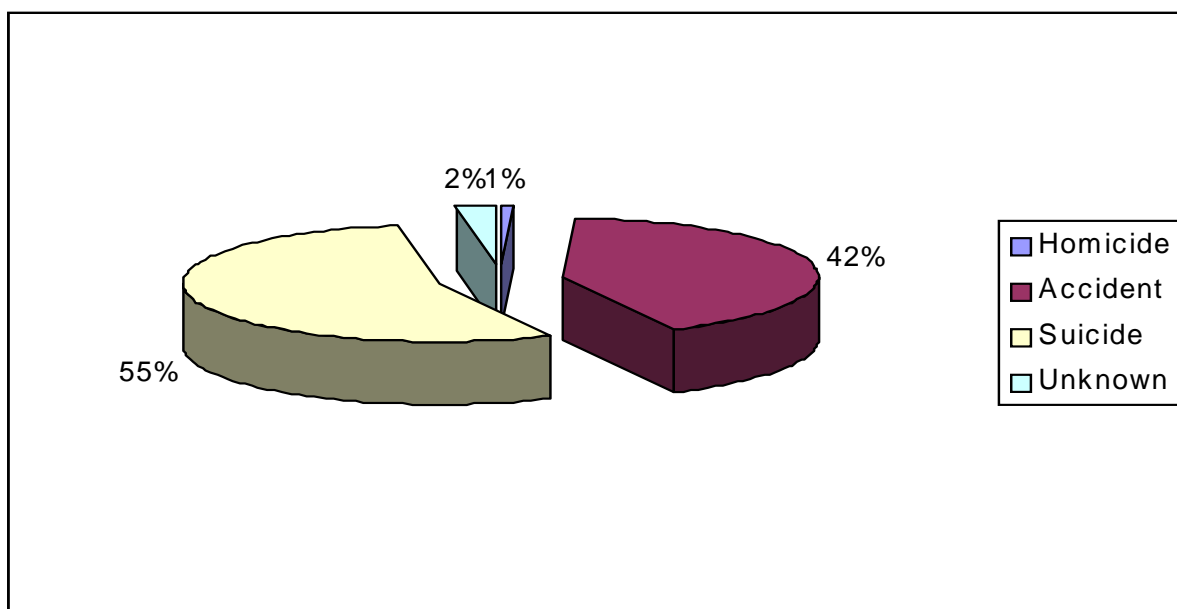


Figure 15C—Carbon Monoxide Fatalities by Manner of Death, Missouri 2001-2004

## Section C - Environmental Surveillance

### Hyperthermia

DHSS monitors high temperatures and humidity across the state and provides health protective recommendations in an effort to prevent heat-related illness and death. The elderly and the chronically ill are more vulnerable to the effects of high temperatures. They perspire less and are more likely to have health problems requiring medications that can impair the body's response to heat. Many prescription medications make individuals more sensitive to the heat. Some of these medications include anti-psychotics, major tranquilizers, antihistamines, over-the-counter sleeping pills, antidepressants, heart drugs and some anti-Parkinsonian agents. Each year many Missourians suffer from heat-related illnesses, with some cases resulting in death. During prolonged periods of high temperatures air conditioning is the best preventive measure.

DHSS initiated statewide hyperthermia death surveillance in 1980 in response to a summer heat wave that resulted in the death of 295 individuals. Missouri's heat-related deaths are primarily concentrated in urban, more densely populated areas of St. Louis City, St Louis County and Jackson County (Kansas City) (**Figure 16C**). From 2000 through 2004, of the total 110 deaths, there were 67 (61%) deaths in these metropolitan areas. Rural deaths accounted for 43 (39%) of deaths. This figure includes the death of one Kansas resident while at a Missouri recreational area in August, 2003. During the cooler and rainier summer of 2004, there were only 3 heat-related deaths in Missouri. All heat-related deaths are confirmed by review of death certificates, ensuring heat or a hot natural environment is a contributing or principal cause.

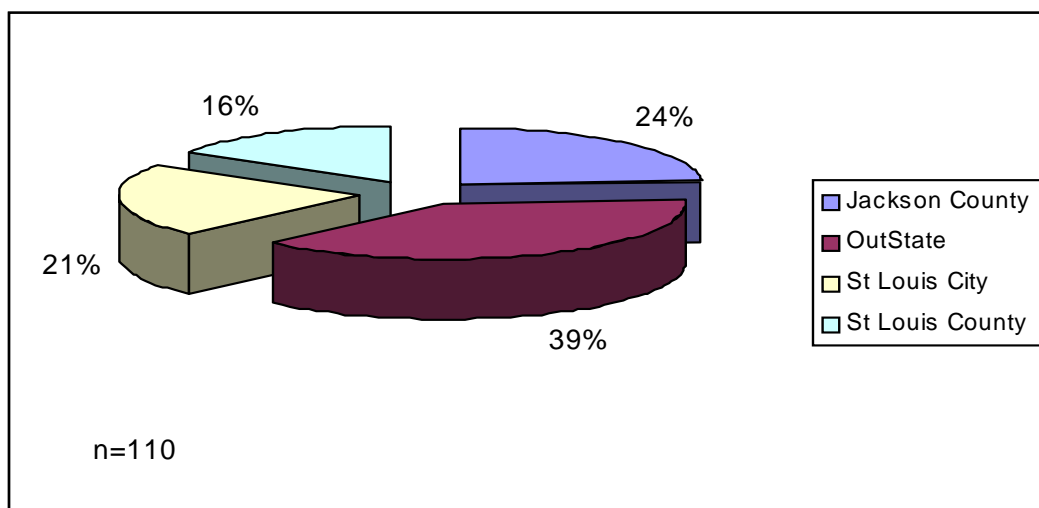
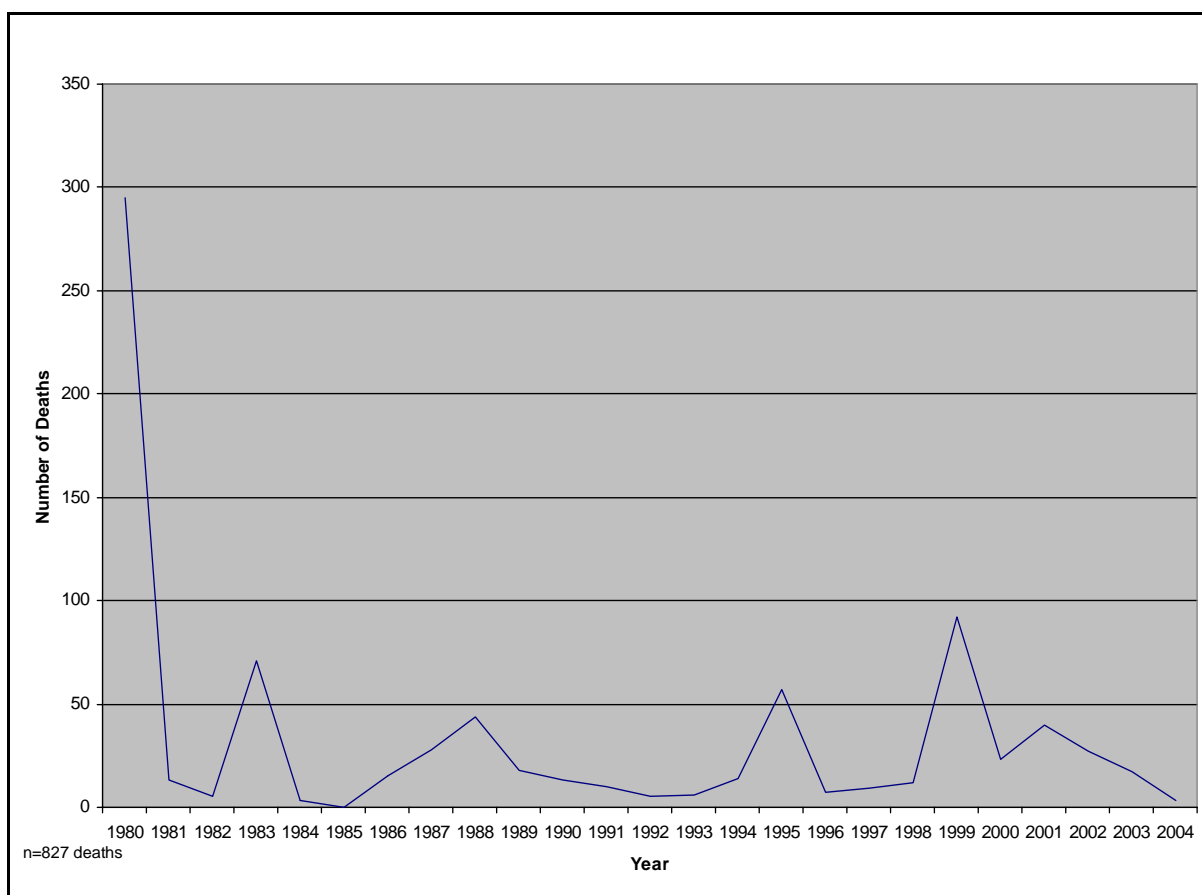


Figure 16C—Hyperthermia Deaths by Geographic Area, Missouri 2000-2004

## Section C - Environmental Surveillance

### Hyperthermia (continued)

The number of deaths during the summer months has varied over the years in response to the severity and length of hot periods (**Figure 17C**).



**Figure 17C—Missouri Hyperthermia Deaths, 1980-2004**

## Section C - Environmental Surveillance

### Hyperthermia (continued)

The greatest number (225, 64%) of deaths 1989-2004 have been of people age 65 years and older. Deaths in this population are often in individuals living alone who have other complicating medical conditions. Hyperthermia deaths of younger persons often have other contributing causes such as physical activity, alcohol or illegal drug use, or occur when children are left unattended in automobiles (**Figure 18C**).

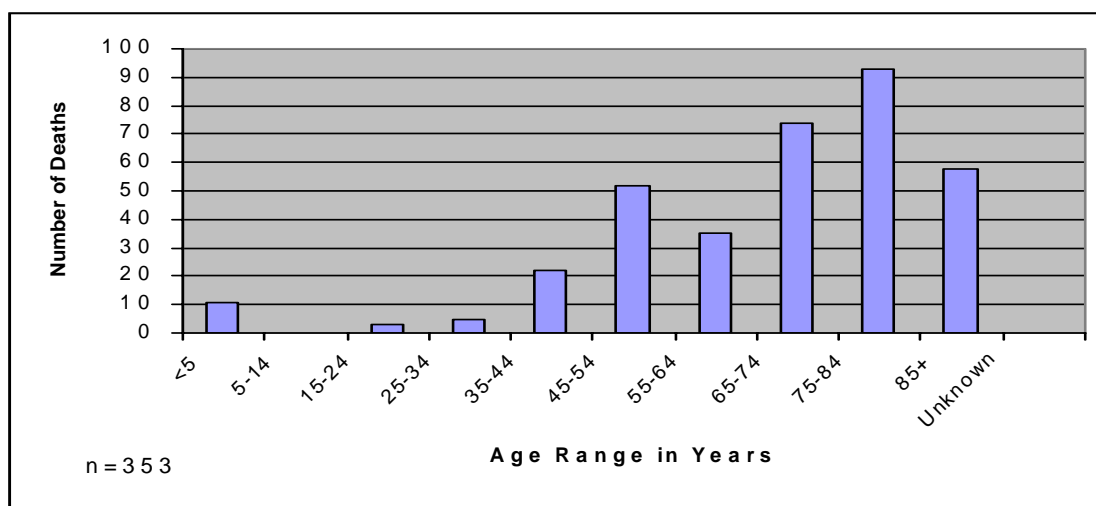


Figure 18C—Hyperthermia Deaths by Age, Missouri 1989-2004

White males are the most frequent victims of heat-related illness resulting in death (**Figure 19C**). Missouri is the only state which conducts on-going statewide surveillance for natural heat related illnesses and deaths.

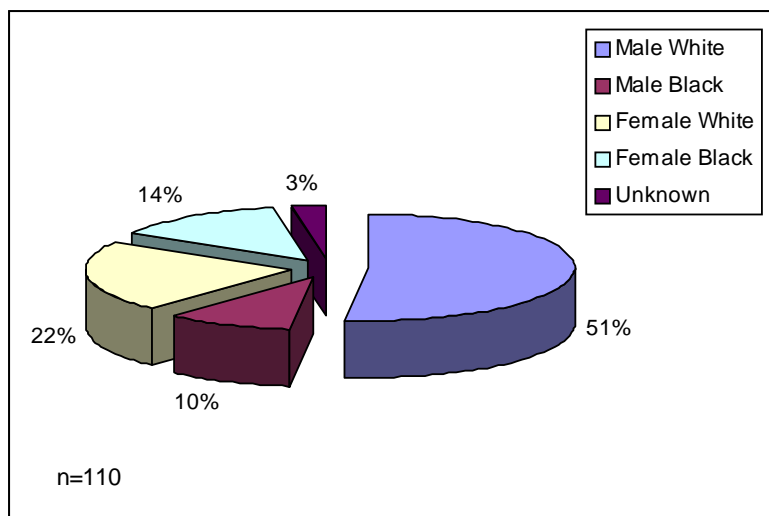
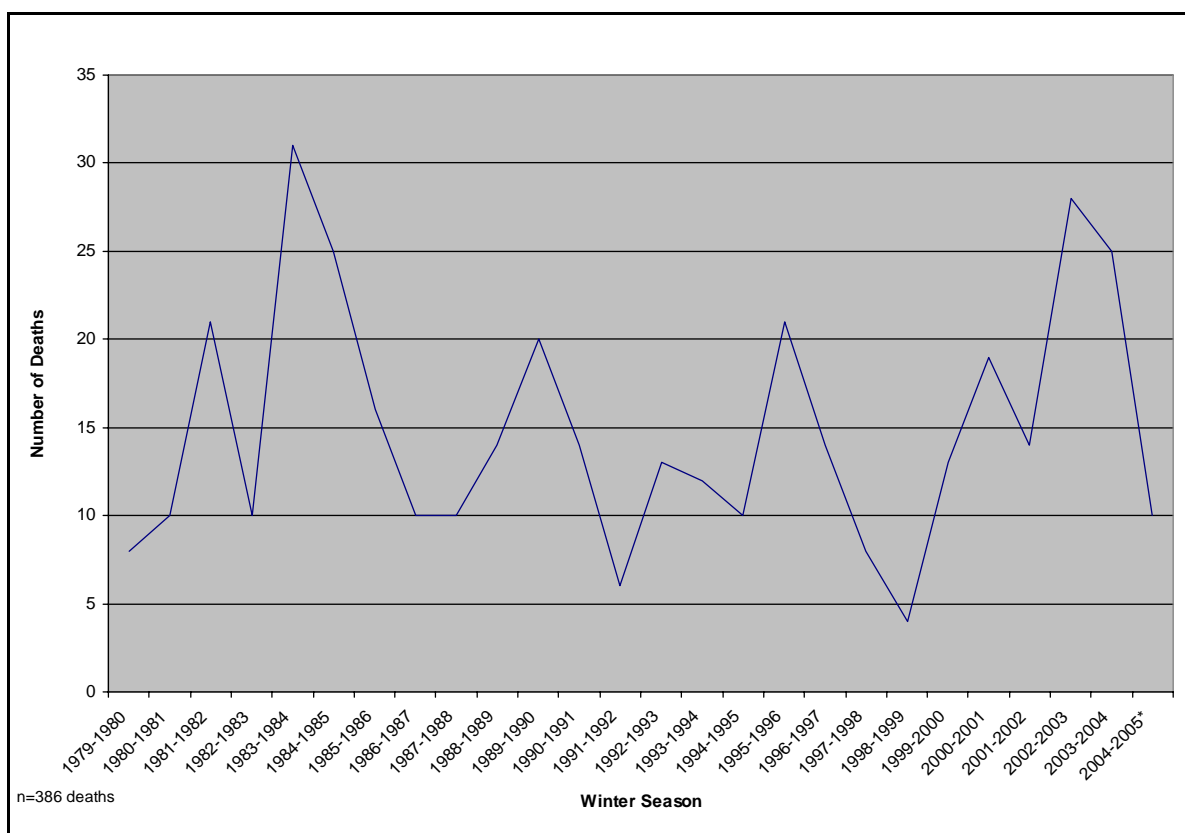


Figure 19C—Hyperthermia Deaths by Race and Sex, Missouri 2000-2004

## Section C - Environmental Surveillance

### Hypothermia

Hypothermia is defined as a cold injury associated with a fall of body temperature to less than 94.1°F which results from unintentional exposure to a natural cold environment. In Missouri, 386 people have died from the cold during the winter months since 1979 when data collection of hypothermia first began in Missouri (**Figure 20C**). There were 25 deaths during the 2003-2004 cold weather season and 10 deaths during the 2004-2005 season (preliminary data).



**Figure 20C—Hypothermia Deaths, Missouri Winter Seasons 1979-2005\***

\*preliminary data

## Section C - Environmental Surveillance

### Hypothermia (continued)

The elderly are more likely to be victims of cold-related illness resulting in death (**Figure 21C**). Too often handicapped or elderly individuals fall outside their homes and are unable to reach shelter or help (**Figure 22C**).

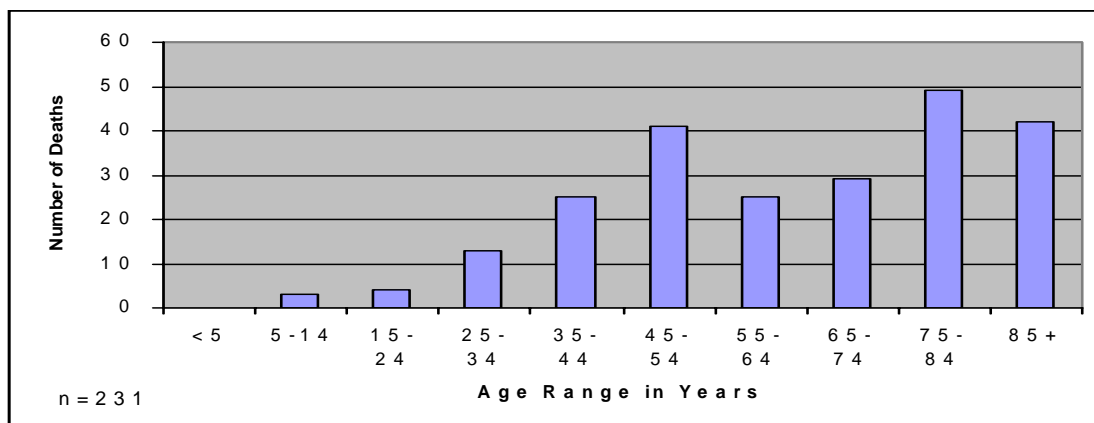


Figure 21C—Hypothermia Deaths by Age, Missouri Winter Seasons 1989-2005\*

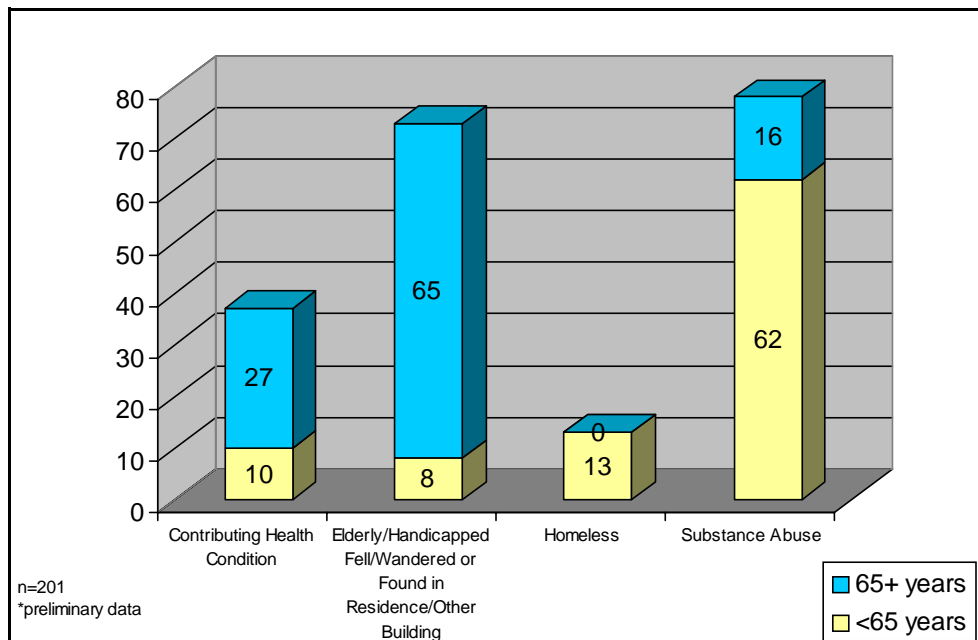


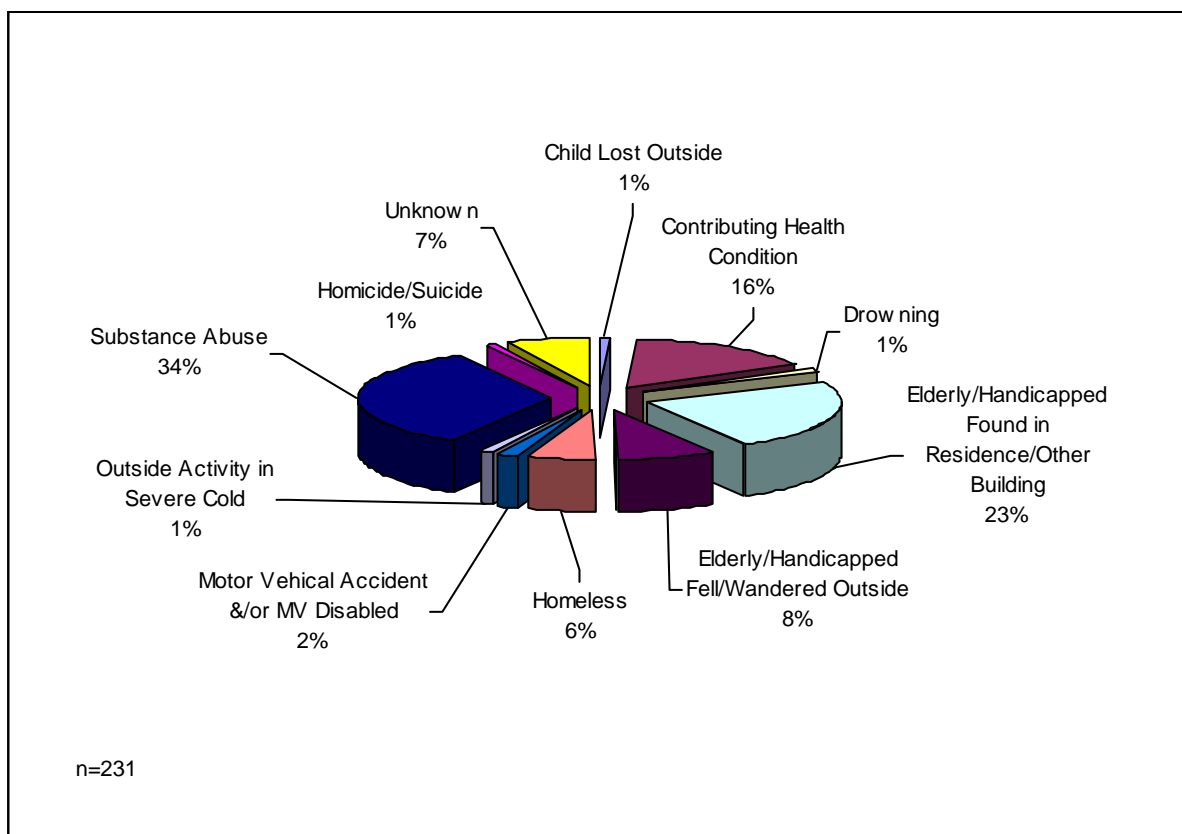
Figure 22C—Hypothermia Deaths by Age and Selected Cause/Risk Factors, Missouri 1989-2005\*

\*preliminary data

## Section C - Environmental Surveillance

### Hypothermia (continued)

During the cold weather seasons from 1989 through 2005 (preliminary data), 120 (52%) hypothermia deaths were of people age 65 years and older. Deaths of individuals between the ages of 25-64 often have a contributing cause of substance abuse or a debilitating medical condition (**Figure 23C**). Since 1989, there have been 104 (45%) hypothermia deaths in this population. Fortunately, deaths in people age <25 years are rare, accounting for only 7 (3%) of the total 231 Missouri hypothermia deaths for the years 1989-2005 (preliminary data).



**Figure 23C—Hypothermia Deaths by Cause and/or Risk Factors, Missouri 1989-2005\***

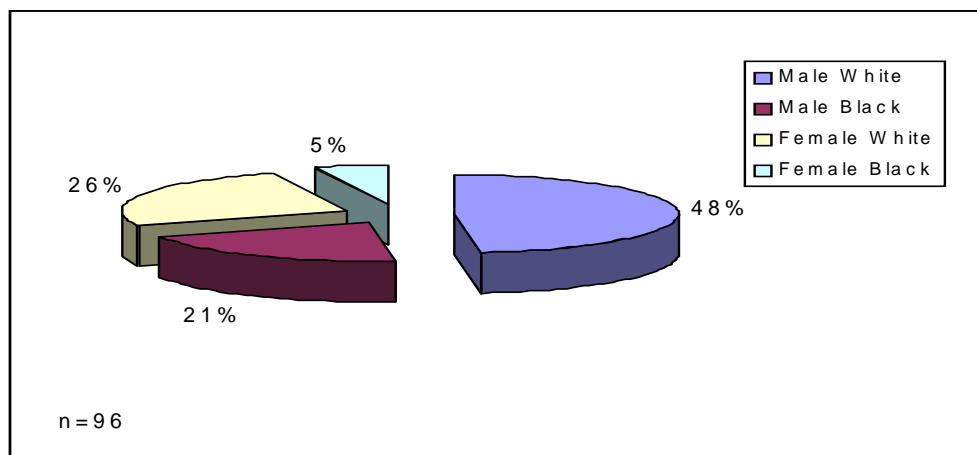
\*preliminary data



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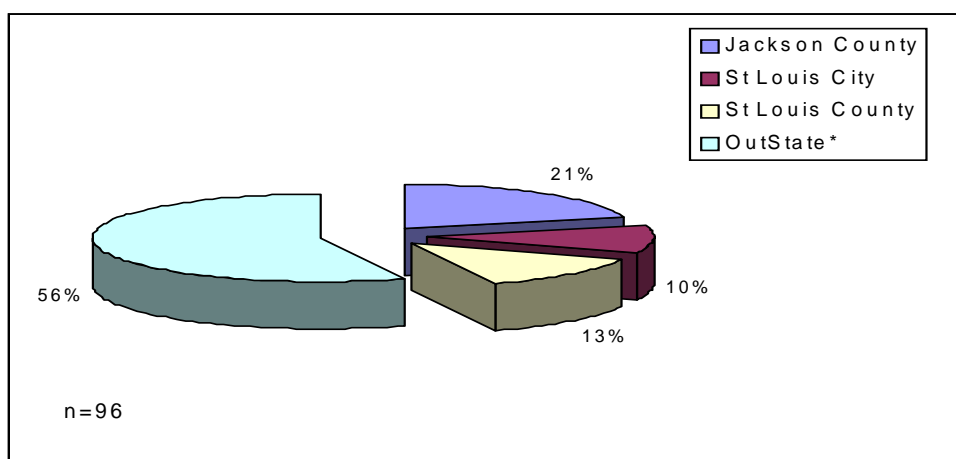
### Hypothermia (continued)

From cold weather winter seasons 2000 through 2005 (preliminary data), the largest number of deaths were among white males comprising 48% (n=46) of the 96 total cold related deaths (**Figure 24C**).



**Figure 24C—Hypothermia Deaths by Race and Sex, Missouri Winter Seasons 2000-2005\***

The majority, 54 (56%), of deaths occurred in the non-metropolitan areas of Missouri (**Figure 25C**). Jackson County had 20 (21%) deaths, St Louis County had 12 (13%), and St Louis City had 10 (10%) of the total 96 hypothermia deaths since 2000. Missouri is the only state that conducts on-going statewide surveillance for natural cold related illnesses and deaths.



**Figure 25C—Hypothermia Deaths by Geographic Area, Missouri Winter Seasons 2000-2005\***

\*preliminary data



## Section C - Environmental Surveillance

### Mercury Poisoning

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas. Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make. Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants. It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity. Methylmercury may be formed in water and soil by small organisms called bacteria. Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

Humans are exposed to mercury most commonly by:

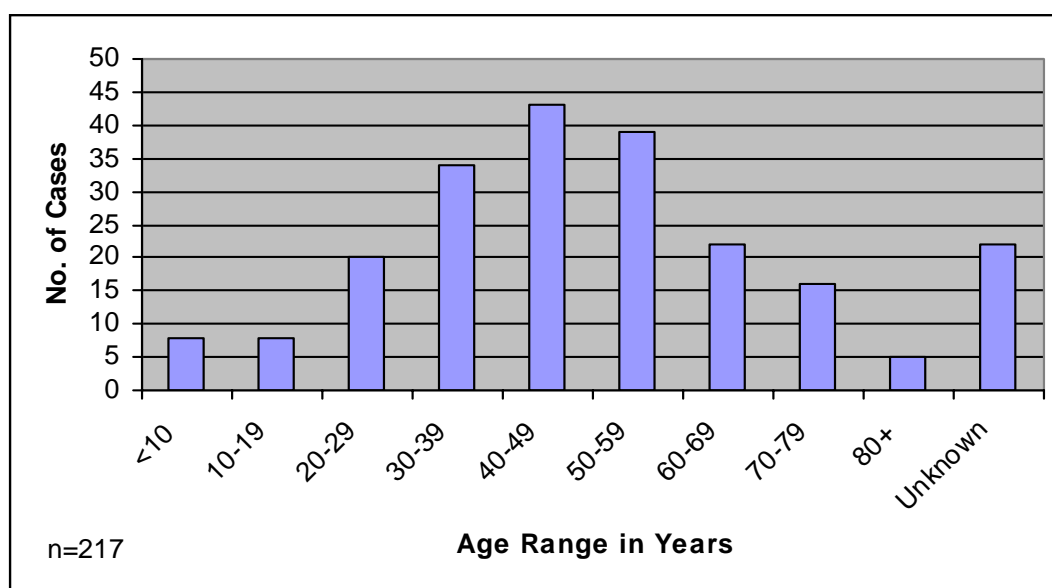
- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

The human nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems. Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

## Section C - Environmental Surveillance

### Mercury Poisoning (continued)

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also pass to a nursing infant through breast milk. However, the benefits of breast-feeding may be greater than the possible adverse effects of mercury in breast milk. Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage. **Figure 26C** shows the number of cases of mercury poisoning by patient age range in years.



**Figure 26C—Mercury Poisoning Cases by Age, 2001-2004**

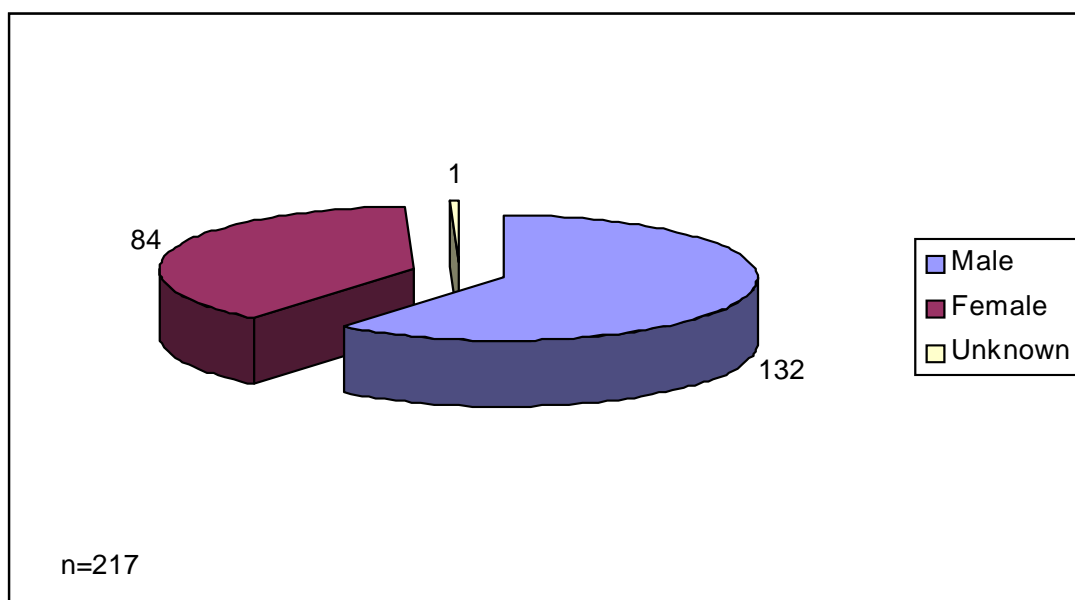
To reduce your risk of mercury exposure, carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids. Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children. Pregnant women and children should keep away from rooms where liquid mercury has been used. Learn about wildlife and fish advisories in your area from your public health or natural resources department.

## Section C - Environmental Surveillance

### Mercury Poisoning (continued)

Medical tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Health care practitioners and laboratories are required by law to report results of mercury testing of Missourians. In the years 2001-2004, the Missouri Department of Health and Senior Services received reports of 217 cases of mercury poisoning. Males comprised 132 (60.8%), females 84 (38.7%) and the sex of one case (0.5%) was unknown. See **Figure 27C**.



**Figure 27C—Mercury Poisoning Cases by Sex, 2001-2004**

References: Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Managing Hazardous Materials Incidents. Volume III – Medical Management Guidelines for Acute Chemical Exposures: Mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.  
Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological Profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.